

AO 120 (Rev. 08/10)

<b>TO: Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been  
 filed in the U.S. District Court District of Nevada on the following

☐ Trademarks or ☒ Patents. ( ☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:20cv01558-RFB-VCF	DATE FILED 8/21/2020	U.S. DISTRICT COURT District of Nevada
PLAINTIFF Lakshmi Arunachalam		DEFENDANT CSAA Insurance Group
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
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5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
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CLERK Debra Kempf	(BY) DEPUTY CLERK H. Magennis	DATE 8/31/2020
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IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF NEVADA

Dr. Lakshmi Arunachalam,

a woman,

vs.

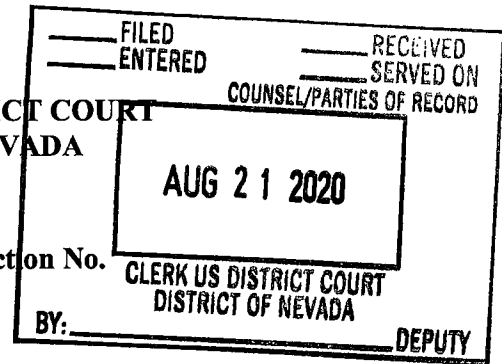
CSAA Insurance Group,

Defendant.

Civil Action No.

DEMAND FOR JURY TRIAL

2:20-cv-01558-RFB-VCF



**COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff Dr. Lakshmi Arunachalam ("Dr. Arunachalam") hereby files this complaint for patent infringement against CSAA Insurance Group ("CSAA" or "Defendant") and alleges as follows:

**JURISDICTION AND VENUE**

1. This is an action for patent infringement arising under the patent laws of the United States, Title 35 of the United States Code. This Court has subject-matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).
2. On information and belief, this Court has personal jurisdiction over CSAA by virtue of its presence and business activities within this judicial district. On information and belief, CSAA has committed acts of infringement within this judicial district through its business activities.
3. On information and belief, CSAA is authorized to provide insurance and other financial products in the states of California, Nevada and other states. On information and belief, by way of example and without limitation, CSAA has committed acts of infringement within this

judicial district at least by providing insurance and other financial products via Web applications displayed on a Web browser and Web insurance and financial Web applications displayed on a Web browser from which real-time Web transactions are performed.

4. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391(b), 1391(c) and 1400(b).

### **THE PARTIES**

5. Plaintiff Dr. Arunachalam, is an individual, with her principal place of business at 222 Stanford Avenue, Menlo Park, California 94025. Dr. Arunachalam is the inventor and assignee of the Plaintiff's U.S. 5,987,500 Patent ("the '500 patent"), U.S. 8,108,492 Patent ("the '492 patent"), and U.S. 8,037,158 Patent ("the '158 patent"), the patents asserted here, the patents-in-suit.

6. Dr. Arunachalam, a 72-year old, disabled, single woman of color, born in India, citizen of the United States, obtained her Ph.D. in Electrical Engineering and living and working in high-tech in the United States for 50 years, is the inventor of the Internet of Things (IoT) — Web applications displayed on a Web browser. The United States Patent Office (USPTO) granted Dr. Arunachalam 11 patents, as well as the patents-in suit, that have a priority date of 1995, a time when two-way real-time Web transactions from Web Applications were non-existent.

7. Examples of Dr. Arunachalam's IoT machines are the millions of Web Apps in Apple's App Store in Apple's iPhone, and on Google Play on Android devices, Web banking Web Apps, Web insurance Web Apps, healthcare Web Apps, Facebook, Twitter and other social networking Web Apps, and myriads of other Web Apps.

8. Since being granted her Patents, Dr. Arunachalam entered into Intellectual Property (IP) licensing agreements with Fortune 500 companies, Bank of America, Capital One, Barclays Bank, UBS, M&T Bank, Sovereign Bank, Walmart, TD Bank, Ally Bank, **All State Insurance**, to name a few.

9. On information and belief, CSAA has its principal place of business at **CSAA Insurance Group**, Corporate Headquarters, 3055 Oak Road, Walnut Creek, CA 94597; Tel: 925.279.2300. Its CEO, Thomas M. Troy, is formerly from All State Insurance; its General Counsel is Michael Zukerman. CSAA has many offices in Las Vega, Nevada.

### **BACKGROUND**

10. Dr. Arunachalam has been injured financially and physically by the concerted, patently oppressive, **corrupt process disorder** by the Judiciary acting as Attorneys to Corporate Infringers (as in the Gen. Flynn case), all disorders and neglects to the prejudice of good order, discipline and justice, of a nature to bring discredit upon the Judiciary and United States, and crimes and offenses which violate Federal and state laws and the Constitution. The denial of due process could not have been more egregious by the Judiciary depriving her of her right to jury trial. As a result, Dr. Arunachalam has not had her day in court, in over a decade, in 100 cases of patent infringement, antitrust, RICO. They collusively deprived Dr. Arunachalam of her rights without remedies.

11. On 9/16/2011, the Leahy-Smith America Invents Act (AIA), also called the Patent Reform Act of 2011, was enacted into law by then President Obama, **in contempt of the Mandated Prohibition** — AGAINST REPUDIATING GOVERNMENT ISSUED PATENT CONTRACT GRANTS — **stare decisis Governing Supreme Court Precedents**, as declared by Chief Justice Marshall, to fast-track invalidate granted patents **in a corrupted re-examination process**.

without considering material *prima facie* intrinsic evidence – Patent Prosecution History, which is no re-examination at all.

**Res accendent lumina rebus**

***One thing throws* [‘Constitutional’.] *Light upon others.***

*THE ONE THING*, here is the (*collusively*) concerted (*oppressive*) silence (*as willful and wanton public fraud*) in ‘*Breach of Solemn Oath Duty*’ under ‘*Color of Law and Authority*’ – NONFEASANCE<sup>1</sup>-FAILURE(S) to uphold and enforce the (*stare decisis*) ‘*MANDATED PROHIBITION*’ – AGAINST REPUDIATING GOVERNMENT ISSUED CONTRACT GRANTS [*FLETCHER V. PECK* (1810).] (*of any kind without just compensation* [*Dartmouth College.*]) —the Law of the Case and Law of the Land; CORRUPTLY, designed in ‘*Breach of Public Contract*’ to violate the Supremacy and Contract Clause(s).

12. Since enactment of the AIA<sup>2</sup>, Dr. Arunachalam has greatly been harmed in her ability to enforce the use of her IP without receiving royalties.

13. As a result, Dr. Arunachalam has been financially injured in the order of trillions of dollars by the largest heist of the century of her intellectual property by Corporate Infringers who signed NDAs with her in 1995, without paying royalties. Companies like Apple, Amazon, Samsung Electronics America, Inc., Facebook, Alphabet, Microsoft, IBM, SAP America, Inc.,

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<sup>1</sup> It is a case of **Collective Nonfeasance** by the Judiciary, Legislature and Executive Branch (the Agency) in their failure to acknowledge, let alone enforce, the Law of the Case and Supreme Law of the Land — the *Mandated Prohibition* of the Constitution from repudiating a Government-issued contract grant — declared by Chief Justice Marshall in Governing Supreme Court Precedents that **“the law of this case is the law of all ...is applicable to contracts of every description...there is nothing for the courts to act upon...”** They *disparately* failed to abide by both Federal Circuit Precedents and Governing Supreme Court Precedents, while **concertedly sharing a common objective** — to remain silent as fraud, willfully and wantonly avoiding enforcing the *Mandated Prohibition* of the Constitution and Governing Supreme Court Precedents.

<sup>2</sup> Congress engaged in **Misfeasance** by enacting the:

- Federal Courts Improvement Act (FCIA) of 1982 creating the Federal Circuit to violate the Contract Clause of the Constitution; and
- America Invents Act (AIA) of 2011 for the Executive Branch (USPTO) to perform the function of the Judiciary in violation of the Separation of Powers Clause and Contract Clause of the Constitution by USPTO’s unconstitutionally appointed judges (APJs) in violation of the Appointments Clause of the Constitution, as declared in *Arthrex* by the Federal Circuit.

CSAA Chase & Co, Fiserv, Wells Fargo Bank, Citigroup, Citibank, Fulton Financial Corporation, and Eclipse Foundation, Inc., (just to name a few) have all substantially benefited both financially and in terms of their growth by their continued, unlicensed use of Dr. Arunachalam's intellectual property.

14. There are certain moral attributes common to the ideal officer and the perfect gentleman, a lack of which is indicated by acts of dishonesty, unfair dealing, indecency, indecorum, lawlessness, injustice, or cruelty. Not everyone is or can be expected to meet unrealistically high moral standards, but there is a limit of tolerance based on customs of the service and national necessity below which the personal standards of an officer cannot fall without seriously compromising the person's standing as an officer or the person's character as a gentleman.

15. The rest is about Malfeasance by the Judiciary and USPTO oppressing Dr. Arunachalam, bullying her into silence for being the first one to put them on notice of their solemn oath duty to enforce the *Mandated Prohibition* of the Constitution, engaging in RICO, aiding and abetting anti-trust, obstruction of justice, allowing the importation from China of infringing products, hurting the domestic industry and economy. They deprived Dr. Arunachalam of her rights without remedies.

16. The denial of due process could not have been more egregious by Judges acting as Attorney to Defendants, like in the Gen. Flynn case. As a result, Dr. Arunachalam has not had her day in court.

**I. STARE DECISIS MANDATED PROHIBITION BY THE SUPREME COURT DOES NOT SUPPORT THE JUDICIARY'S AND USPTO/PTAB ORDERS WHICH ARE UNCONSTITUTIONAL AND VOID IN VIEW OF FLETCHER AND ARE NOT LEGALLY SOUND.**

**A. WILLFUL BREACH OF DUTY:**

- (i) **Existence of Duty:** The Judiciary, USPTO and Attorneys to Corporate Infringers have a duty to uphold and enforce the Supreme Law of the Land and Law of the Case — the *stare decisis* Mandated Prohibition from repudiating Government issued Patent Contract Grants declared by Chief Justice Marshall in Governing Supreme Court Precedents, *Fletcher v. Peck* (1810), *Dartmouth College* (1819), *Grant v. Raymond* (1832), *et al.*
- (ii) **They were aware of their duty.** Dr. Arunachalam repeatedly put them on notice of their duty to enforce *Fletcher*, which they ignored.
- (iii) **They wantonly failed in their duty to perform.** They breached their duty and solemn oaths of office. They warred against the Constitution.
- (iv) **Dr. Arunachalam was injured financially and physically by that breach,** which is the proximate cause of the injury to Dr. Arunachalam. The Judiciary and USPTO aided and abetted in the unjust enrichment of Corporate Infringers of the order of trillions of dollars. President Trump's 6/19/2017 (at the American Technology Roundtable, White House<sup>3</sup>) estimated value in excess of \$3.5 trillion from just 22 organizations, all of whom use and benefit from Dr. Arunachalam's property, is substantially less than per Web transaction per Web App in use by each Corporate Infringer and its customers, including the Government.

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<sup>3</sup> Attendee List: Surety Bond Holder Attendees: Oracle, Apple, IBM, Microsoft, CIA, Google, Alphabet, Facebook, Clarion, Palantir, Kleiner Perkins, VMWare, Dell, EMC, NSA, In-Q-Tel, Intel, Qualcomm, Akamai, SAP, CMU, Stanford, Hoover Institution, MasterCard, Amazon, Washington Post, MIT, Ohio State, Accenture, UNC, Adobe and OpenGov.  
Administration Attendees: John F. Kelley, Jared Kushner, Ivanka Trump, Christopher P. Liddell, Steven T. Mnuchin, John M. Mulvaney, David J. Shulkin, Seema Verma.

- (v) **They were collectively malicious.** They made it expensive, hazardous and burdensome for Dr. Arunachalam to have access to the court on the question of due process itself, all in violation of the Constitutional provision. *See ALP VOL.*

**12. CONST. LAW, CH. VII, SEC. 1, §141. With respect to Fundamental, Substantive, and Due Process Itself:**

“Any process or Court attempting to or adjudicating a contract by estopping a material part of it from being considered *prima facie* denies a litigant due process entitlement to an honest, though not learned tribunal; and if injured by the corruption or fraud of the court, is entitled to redress.” [ALP VOL. 12. CONST. LAW, CH. VII, SEC. 1, § 140];

“and final decisions upon the ultimate question of due process cannot be conclusively codified to any non-judicial tribunal. Any attempt to do this whether by direct denial of access to the courts upon this question of due process by hindering access to the courts or making resort to the courts upon it **difficult, expensive, hazardous, all alike violate the Constitutional provision.**” [ALP VOL. 12. CONST. LAW, CH. VII, SEC. 1, §141

**Damages:** not less than \$100B (this is a substantial compromise from President Trump’s 6/19/2017 (at the American Technology Roundtable, White House) estimated value in excess of \$3.5 trillion from just 22 organizations, all of whom use and benefit from Dr. Arunachalam’s property, and which is substantially less than per Web transaction per Web App in use by each Corporate Infringer and its customers, including the Government.) CSAA reported in its website that it had 7000 Web Apps in just one Business Unit.

**II. JUDICIARY DID NOT FIND CHANGED FACTS OR CIRCUMSTANCES TO AVOID PRECLUSION BASED ON PRIOR JUDGMENT NOR CREATE OR CLAIM A PARTICULAR EXCEPTION, TAKING THIS CASE OUT OF THE PROHIBITION CONTAINED IN THE CONSTITUTION:**

Do changes in facts and circumstances exist, and if so, do they support the (in)validity Erroneously and Fraudulently ruled? The relevant facts or circumstances have not changed such that the prior Supreme Court’s *Fletcher* decision should dictate the result in the present case(s).

**JUDICIARY AND ATTORNEYS MADE FALSE OFFICIAL STATEMENTS WITH INTENT TO DECEIVE.**

Judges, with stock in litigants, refused to recuse, Ordered Defendants not to answer Dr. Arunachalam's Complaint(s) and to Default, canceled initial Case Management Conferences, then dismissed Dr. Arunachalam's cases without a hearing, and one year after Judgment and Appeal, Ordered Defendants to move for attorneys' fees, and two years after Judgment, granted attorneys' fees, for "a crime committed by the Adjudicators," "not by Plaintiff," for no injury incurred by Defendants.

17. Judges, with stock in a litigant, refused to recuse, Ordered Defendants not to answer Dr. Arunachalam's Complaint(s), even denying initial Case Management Conferences, allowed Defendants to Default, then dismissed Dr. Arunachalam's cases without a hearing, and then Ordered Defendants to move for attorneys' fees and granted \$150K.

18. The Judiciary and USPTO punished Dr. Arunachalam under the color of law and authority in retaliatory, cruel and unusual punishment in violation of the 8<sup>th</sup> Amendment, making it expensive, hazardous and burdensome for her to have access to the courts—all in violation of the Constitution. *See* ALP Vol XII, Sec. 141.

19. Judges and USPTO impaired the contract protected by the Constitution of the United States by not considering intrinsic material *prima facie* evidence when claims were unambiguous in view of intrinsic evidence – Patent Prosecution History, and not applying the Federal Circuit's *Aqua Products*' reversal of all such Erroneous and Fraudulent Orders that failed to consider "the entirety of the record" and made **False Official Statements** and **False Claims** of collateral estoppel, falsely propagated across all District and Appellate courts, **collaterally estopped by void Orders by financially conflicted Judges** who admitted holding direct stock in the Defendants JPMorgan Chase & Co. and Microsoft and refused to recuse,

without considering intrinsic material *prima facie* evidence and without applying the *stare decisis Mandated Prohibition* of the Constitution — Governing Supreme Court Precedents — both (the intrinsic evidence of the record and the *Mandated Prohibition* of the Constitution) of which collaterally estop the falsely propagated collateral estoppel, **inchoate offenses** collectively committed by the Judiciary, USPTO and Defendants/Corporations. The Judiciary and USPTO aided and abetted in the theft of Dr. Arunachalam’s property, **unjustly enriching Defendants/Corporations by trillions of dollars.**

20. This rescinding act has the effect of an *ex post facto* law and forfeits the estate of Dr. Arunachalam “for a crime not committed by” Dr. Arunachalam, “but by the Adjudicators” by their Orders which “unconstitutionally impaired” the contract with Dr. Arunachalam, which, “as in a conveyance of land, the court found a contract that the grant should not be revoked.” The Judiciary and USPTO bullied Dr. Arunachalam and intimidated her, took away her electronic filing capability after refusing to recuse for holding stock in Microsoft, awarded \$150K as attorneys’ fees after refusing to recuse for holding stock in JPMorgan Chase & Co., for the crime committed by the Adjudicators, sent the U.S. Marshall to Dr. Arunachalam’s home and to accost her at public events such as at Stanford Law School, *disparately* ordering her to call a teleconference meeting with the Board and with the Defendants to request that her filings be docketed in 18 re-exams. They denied Dr. Arunachalam both procedural due process and substantive due process and denied her fundamental right to emergency medical care during a medical crisis and dismissed her case despite and during a medical crisis. District Court judges **ridiculed Dr. Arunachalam for her speech impediment from a head injury and concussion and refused to release the audio transcripts,** tampered with the record, hid her filings, struck her filings for no valid rhyme or reason, stayed their oaths of office.

21. Courts/USPTO denied Dr. Arunachalam the protection from Patent Prosecution History, a key contract term between Dr. Arunachalam, the Inventor and Government.

Defendants and Judges concealed material *prima facie* evidence Dr. Arunachalam's patent claims are not invalid nor indefinite, propagated a false Collateral Estoppel Argument, which fails in light of Governing Supreme Court Precedents and Federal Circuit's *Aqua Products*' 15-1177 (2017) ruling that voided all Court and PTAB Orders that failed to consider "the entirety of the record"—Patent Prosecution History, material *prima facie* evidence that her patent claims are neither invalid nor claim terms indefinite. Supreme Court's *Festo* ruling restrains the lower courts from *disparately* failing to consider Patent Prosecution History in Dr. Arunachalam's cases. *Festo Corp. v Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722 (2002).

22. The Federal Circuit's recent ruling in *Arthrex* that the PTAB re-examination judges were appointed unconstitutionally, in violation of the Appointments clause of the Constitution, voids all PTAB rulings in 18 or so re-exams of Dr. Arunachalam's patents, as in the Federal Circuit's recent *VirnetX* ruling.

23. Dr. Arunachalam's properties are protected by contract, itself protected by the Constitution of the United States. The Erroneous and Fraudulent Orders by the Judiciary and Agency impaired the contract and impaired Dr. Arunachalam's properties and violated the Constitution of the United States. **Dr. Arunachalam is entitled to Constitutional redress.**

24. The Judiciary deprived Dr. Arunachalam of the payment for each Web transaction per Web application in use, which it allowed Corporate America to steal.

25. Dr. Arunachalam's inventions are in ubiquitous use worldwide, allowing Microsoft, IBM, SAP, JPMorgan Chase & Co. and the U.S. Government to make \$trillions,

including investors with stock in the above Corporations, like Judge Richard G. Andrews, PTAB Judges McNamara, Stephen C. Siu who refused to recuse.

26. District and Appellate Court Orders violate the U.S. Constitution, inconsistent with the “faithful execution of the solemn promise made by the United States” with the inventor and constitute treason. J. Marshall declared ‘**Crime by the Adjudicators**’ in *Fletcher*:

27. Chief Justice Marshall declared that any acts and Orders by the Judiciary that impair the obligation of the contract within the meaning of the Constitution of the United States **“are consequently unconstitutional and void.”**

28. This entire Case revolves around the Judiciary avoiding enforcing *Fletcher*, at all costs.

29. The fact of the matter — the State of the Union — is: there is no middle ground. The Court is not fooling anyone. The three Branches of Government concertedly share a common objective — to remain silent as fraud, willfully and wantonly avoiding enforcing *Fletcher* and Governing Supreme Court Precedents. Why has the Judiciary not enforced *Fletcher* and Governing Supreme Court Precedents? They know why — because enforcing *Fletcher* exposes the entire Patent System, operating as a criminal enterprise, defrauding the public.

30. Dr. Arunachalam has been forced to state the obvious. Courts dismissed her Cases for false reasons while Chief Justice Roberts admitted by his recusal on 5/18/20 that the facts and the law are on Dr. Arunachalam’s side. This voids all his Orders in ALL of Dr. Arunachalam’s cases, as well as in Case 18-9383. Chief Justice Roberts’ wife running a legal recruiting firm placing lawyers at opposing law firms and opposing corporations, IBM, Microsoft, is a huge

financial conflict of interest for Chief Justice Roberts. Eight Justices remained silent. Is this not misprision of treason? They breached their solemn oaths of office and failed to enforce *Fletcher*.

31. The Supreme Court already reversed the unconstitutional void Orders in Dr. Arunachalam's cases in 1810 and 1819. Chief Justice Marshall declared that any acts and Orders by the Judiciary that impair the obligation of the contract within the meaning of the Constitution of the United States "are consequently unconstitutional and void."

32. The entire Judiciary breached its solemn oaths of office and lost jurisdiction in violating the law and the law is the Constitution in failing to: (i) Enforce the Law of the Land - *Fletcher, Dartmouth College, Grant v. Raymond* and other *stare decisis* Governing Supreme Court Precedents. (ii) Reverse all unconstitutional void Orders in Dr. Arunachalam's cases. (iii) Declare America Invents Act reexamination provision null and void, as violating the prohibition of the Constitution, thereby reinstating all granted patents invalidated by said mal-administered re-examination process without considering intrinsic evidence — Patent Prosecution History. (iv) Order Corporate Infringers to pay the royalties rightfully owed to the inventor.

33. Dr. Arunachalam was left with no remedies, as the Judiciary is hell-bent on obstructing justice and aiding and abetting anti-trust by Corporate Infringers against a small business and Dr. Arunachalam, the inventor, whose inventions are the backbone of the nation's economy, and powers national security and has enabled the nation to work remotely during COVID.

### **GENERAL ALLEGATIONS**

34. On January 31, 2012, U.S. Patent No. 8,108, 492, entitled "Web application network portal" ("the '492 patent"), was duly and legally issued by the United States Patent and Trademark Office with Dr. Lakshmi Arunachalam as the named inventor. The entire right, title,

and interest in and to the '492 patent have been assigned to Dr. Lakshmi Arunachalam. The '492 Patent has been in full force and effect since its issuance, since all prior Orders by District and Appellate Courts and PTAB are void, for want of jurisdiction, in contempt of *stare decisis* Supreme Court Governing Precedents. Fraud on the court which occurred previously in 12-282-RGA entitles Dr. Arunachalam to bring this action at any time, as there is no statute of limitations. A true and correct copy of the '492 patent is attached hereto as Exhibit A.

35. On November 16, 1999, U.S. Patent No. 5,987,500 , entitled "Value-added network system for enabling real-time, bi-directional transactions on a network" ("the '500 patent"), was duly and legally issued by the United States Patent and Trademark Office with Dr. Lakshmi Arunachalam as the named inventor. The entire right, title, and interest in and to the '500 patent have been assigned to Dr. Lakshmi Arunachalam. The '500 patent has been in full force and effect since its issuance, since all prior Orders by District and Appellate Courts and PTAB are void, for want of jurisdiction, in contempt of *stare decisis* Supreme Court Governing Precedents. Fraud on the court which occurred previously in 12-282-RGA entitles Dr. Arunachalam to bring this action at any time, as there is no statute of limitations. A true and correct copy of the '500 patent is attached hereto as Exhibit B.

36. On October 11, 2011, U.S. Patent No. 8,037,158 entitled "Multimedia transactional services" ("the '158 patent"), was duly and legally issued by the United States Patent and Trademark Office with Dr. Lakshmi Arunachalam as the named inventor. The entire right, title, and interest in and to the '158 patent have been assigned to Dr. Lakshmi Arunachalam. The '158 patent has been in full force and effect since its issuance, since all prior Orders by District and Appellate Courts and PTAB are void, for want of jurisdiction, in contempt of *stare decisis* Supreme Court Governing Precedents. Fraud on the court which occurred

previously in 12-282-RGA entitles Dr. Arunachalam to bring this action at any time, as there is no statute of limitations. A true and correct copy of the '158 patent is attached hereto as Exhibit C.

37. The '492, '500 and '158 patents (collectively "the Patents-in-Suit") involve technology for enabling real-time, distributed, two-way Web transactional capabilities from Web applications displayed on a Web browser.

38. On information and belief, Defendant provides insurance and financial products. On information and belief, Defendant and its internal and external customers use Web insurance Web applications displayed on a Web browser and Web financial Web applications displayed on a Web browser provided by at least CSAA to perform real-time Web transactions from.

39. On information and belief, Defendant has deployed a multitude of Web applications, for example, JPMorgan website states just one business unit has deployed 7000 Web apps, likewise CSAA has thousands of Web Apps, from which trillions of real-time Web transactions are performed on a daily basis to give Defendant's customers, both internal and external, access to Defendant's various insurance and financial products, customer accounts, and other information. By way of example and without limitation, at least <https://csaa-insurance.aaa.com/> is a website that, on information and belief, provides Web insurance Web apps and other Web financial Web apps, from which real-time Web transactions are performed, including without limitation access to Defendant's products, and servicing of and access to customer accounts. On information and belief, at least some of Defendant's products have been displayed as Web apps on a Web browser from which real-time Web transactions that originated from within this judicial district are performed.

**COUNT I**

**INFRINGEMENT OF U.S. PATENT NO. 8,108,492 BY DEFENDANT**

40. All the preceding Paragraphs are hereby incorporated by reference as if fully set forth herein.

41. On information and belief, Defendant has been and is now infringing, inducing infringement, and contributing to the infringement of the '492 patent by making, using, selling, offering to sell, instructing and/or supporting the use by others in the U.S. of devices, systems and methods covered by one or more claims of the '492 patent in violation of 35 U.S.C. § 271, *et seq.* Defendant's infringing acts include, by way of example and without limitation, their making, using, selling, offering for sale, instructing and/or supporting the use by others of at least the *csaa-insurance.aaa.com* website, and other websites and/or software systems that make use of and/or facilitate real-time two-way Web transactions from Web apps displayed on a Web browser.

42. The infringement of the '492 patent by Defendant has caused and will continue to cause Dr. Arunachalam substantial and irreparable injury, for which she is entitled to receive all relief provided for by 35 U.S.C. §§ 283 and 284, including, but not limited to, injunctive relief, damages and costs where appropriate.

**COUNT II**

**INFRINGEMENT OF U.S. PATENT NO. 5,987,500 BY DEFENDANT**

43. All preceding Paragraphs are hereby incorporated by reference as if fully set forth herein.

44. On information and belief, Defendant has been and is now infringing, inducing infringement, and contributing to the infringement of the '500 patent by making, using, selling,

offering to sell, instructing and/or supporting the use by others in the U.S. of devices, systems and methods covered by one or more claims of the '500 patent in violation of 35 U.S.C. § 271, *et seq.* Defendant's infringing acts include, by way of example and without limitation, their making, using, selling, offering for sale, instructing and/or supporting the use by others of the *csaa-insurance.aaa.com* and other Web insurance and Web financial Web app websites, and other websites and/or software systems that make use of and/or facilitate real-time two-way distributed transactions over the Internet.

45. The infringement of the '500 patent by Defendant has caused and will continue to cause Dr. Arunachalam substantial and irreparable injury, for which she is entitled to receive all relief provided for by 35 U.S.C. §§ 283 and 284, including, but not limited to, injunctive relief, damages and costs where appropriate.

### **COUNT III**

#### **INFRINGEMENT OF U.S. PATENT NO. 8, 037, 158 BY DEFENDANT**

46. All preceding Paragraphs are hereby incorporated by reference as if fully set forth herein.

47. On information and belief, Defendant has been and is now infringing, inducing infringement, and contributing to the infringement of the '158 patent by making, using, selling, offering to sell, instructing and/or supporting the use by others in the U.S. of devices, systems and methods covered by one or more claims of the '158 patent in violation of 35 U.S.C. § 271, *et seq.* Defendant's infringing acts include, by way of example and without limitation, their making, using, selling, offering for sale, instructing and/or supporting the use by others of the *csaa-insurance.aaa.com* and other websites, and other websites and/or software systems that

make use of and/or facilitate real-time two-way Web transactions from Web apps displayed on a Web browser.

48. The infringement of the '158 patent by Defendant has caused and will continue to cause Dr Arunachalam substantial and irreparable injury, for which it is entitled to receive all relief provided for by 35 U.S.C. §§ 283 and 284, including, but not limited to, injunctive relief, damages and costs where appropriate.

**DEMAND FOR RELIEF**

WHEREFORE, Dr. Arunachalam demands entry of judgment that:

- a. Defendant has infringed and/or induced or contributed to the infringement of the Patents-in-Suit;
- b. Defendant and its respective officers, agents, servants, employees, subsidiaries, parents, attorneys, and all persons acting in concert, on behalf of, in joint venture, or in partnership with Defendant be preliminarily and permanently enjoined from infringing, inducing to infringe, and/or contributing to the infringement of the Patents-in-Suit;
- c. Defendant provide an accounting of its revenues, profits and gains resulting directly or indirectly from Defendant's infringement of the Patents-in-Suit;
- d. Damages be awarded to Dr. Arunachalam to compensate for Defendant's infringement of the Patents-in-Suit;
- e. Defendant pay Dr. Arunachalam pre-judgment and post-judgment interest on the damages awarded;
- f. In the event a permanent injunction against future acts of infringement is not granted by the Court, that Dr. Arunachalam be awarded a compulsory ongoing license fee; and

g. Dr. Arunachalam be granted such other and further relief as this Court may deem just and proper.

**DEMAND FOR JURY TRIAL**

Pursuant to Federal Rule of Civil Procedure 38(b), Dr. Arunachalam demands a jury trial for all issues so triable.

**VERIFICATION**

I, Dr. Lakshmi Arunachalam, Plaintiff in the above entitled action, hereby verify under penalty of perjury, under the laws of the United States of America, that the above statement of facts and laws is true and correct, according to the best of my current information, knowledge, and belief, so help me God, pursuant to 28 U.S.C. 1746(1). See the Supremacy Clause in the Constitution for the United States of America, as lawfully amended (hereinafter "U. S. Constitution").

Dated: August 18, 2020

Signed: Lakshmi Arunachalam

Printed: Dr. Lakshmi Arunachalam

Lakshmi Arunachalam

Dated: August 18, 2020

Dr. Lakshmi Arunachalam  
222 Stanford Avenue,  
Menlo Park, CA 94025  
650-690-0995  
Laks22002@yahoo.com  
*Self-represented Plaintiff*

**DECLARATION OF Dr. Lakshmi Arunachalam IN SUPPORT OF FOREGOING  
COMPLAINT FOR PATENT INFRINGEMENT**


I, Dr. Lakshmi Arunachalam, declare:

I am the inventor and assignee of the U.S. Patent Nos. 8,108,492; 5,987,500; 8,037,158 patents-in-suit in the above-captioned action, all of which derive their priority date from my provisional patent application with S/N 60/006,634 filed November 13, 1995. I reside at 222 Stanford Avenue, Menlo Park, CA 94025. I am *self-represented* Plaintiff in the above-captioned action. I make this declaration based on personal knowledge and, if called upon to do so, could testify competently thereto.

1. Attached as **Exhibit A** is a true and correct copy of Dr. Arunachalam's patent, U.S. Patent No. 8,108,492.
2. Attached as **Exhibit B** is a true and correct copy of Dr. Arunachalam's patent, U.S. Patent No. 5,987,500.
3. Attached as **Exhibit C** is a true and correct copy of Dr. Arunachalam's patent, U.S. Patent No. 8,037,158.

I declare under the penalty of perjury under the laws of the United States and the State of California and Delaware that the foregoing is true and correct. Executed this 18<sup>th</sup> day of August, 2020 in Menlo Park, California.

222 Stanford Avenue  
Menlo Park, CA 94025  
650 690 0995, [laks22002@yahoo.com](mailto:laks22002@yahoo.com)

  
\_\_\_\_\_  
Dr. Lakshmi Arunachalam

**CERTIFICATE OF MAILING**

I, Dr. Lakshmi Arunachalam, hereby certify that on August 18, 2020, I filed an original of the attached "Complaint for Patent Infringement," Dr. Arunachalam's Declaration and Verification in support thereof, and Exhibits A, B and C, and my IFP Motion and one CD containing all of the same, with the Clerk of the Court, U.S. District Court for the District of Nevada by sending it to Parcels Inc of Wilmington Delaware to deliver it via USPS Priority Mail for filing and docketing in this case to:

Clerk of Court  
U.S. District Court for the District of Nevada,  
333 S. Las Vegas Blvd., Las Vegas, NV 89101; Tel: 702.464.5400

DATED: August 18, 2020

Lakshmi Arunachalam

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US008108492B2

(12) **United States Patent**  
**Arunachalam**

(10) **Patent No.:** **US 8,108,492 B2**  
(45) **Date of Patent:** **Jan. 31, 2012**

(54) **WEB APPLICATION NETWORK PORTAL**

(76) Inventor: **Lakshmi Arunachalam**, Menlo Park, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **12/628,060**

(22) Filed: **Nov. 30, 2009**

(65) **Prior Publication Data**

US 2010/0306102 A1 Dec. 2, 2010

**Related U.S. Application Data**

(60) Division of application No. 11/980,185, filed on Oct. 30, 2007, now Pat. No. 8,037,158, which is a continuation-in-part of application No. 09/792,323, filed on Feb. 23, 2001, now Pat. No. 7,340,506, which is a division of application No. 09/296,207, filed on Apr. 21, 1999, now Pat. No. 6,212,556, which is a continuation-in-part of application No. 08/879,958, filed on Jun. 20, 1997, now Pat. No. 5,987,500, which is a division of application No. 08/700,726, filed on Aug. 5, 1996, now Pat. No. 5,778,178.

(60) Provisional application No. 60/006,634, filed on Nov. 13, 1995.

(51) **Int. Cl.**  
**G06F 13/00** (2006.01)

(52) **U.S. Cl.** ..... **709/219; 709/225; 709/228**

(58) **Field of Classification Search** ..... **709/217, 709/219, 223, 224, 225, 227, 229**

See application file for complete search history.

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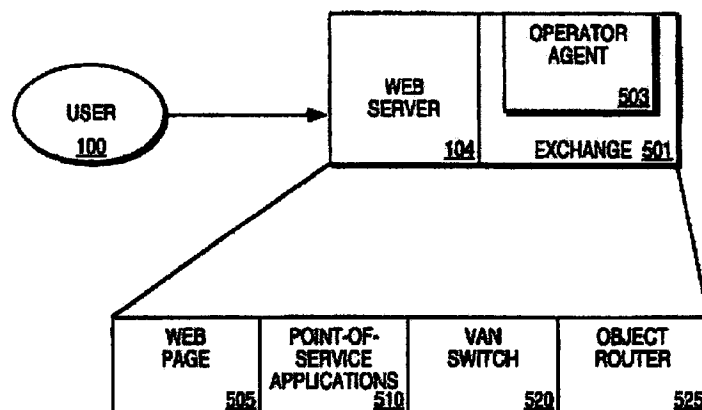
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*Primary Examiner* — Viet Vu

(57) **ABSTRACT**

The present invention provides a method and apparatus for providing real-time, two-way transactional capabilities on the Web. Specifically, one embodiment of the present invention discloses a method for enabling object routing, the method comprising the steps of creating a virtual information store containing information entries and attributes associating each of the information entries and the attributes with an object identity, and assigning a unique network address to each of the object identities. A method is also disclosed for enabling service management of the value-added network service, to perform OAM&P functions on the services network.

**13 Claims, 13 Drawing Sheets**



**Exhibit A**

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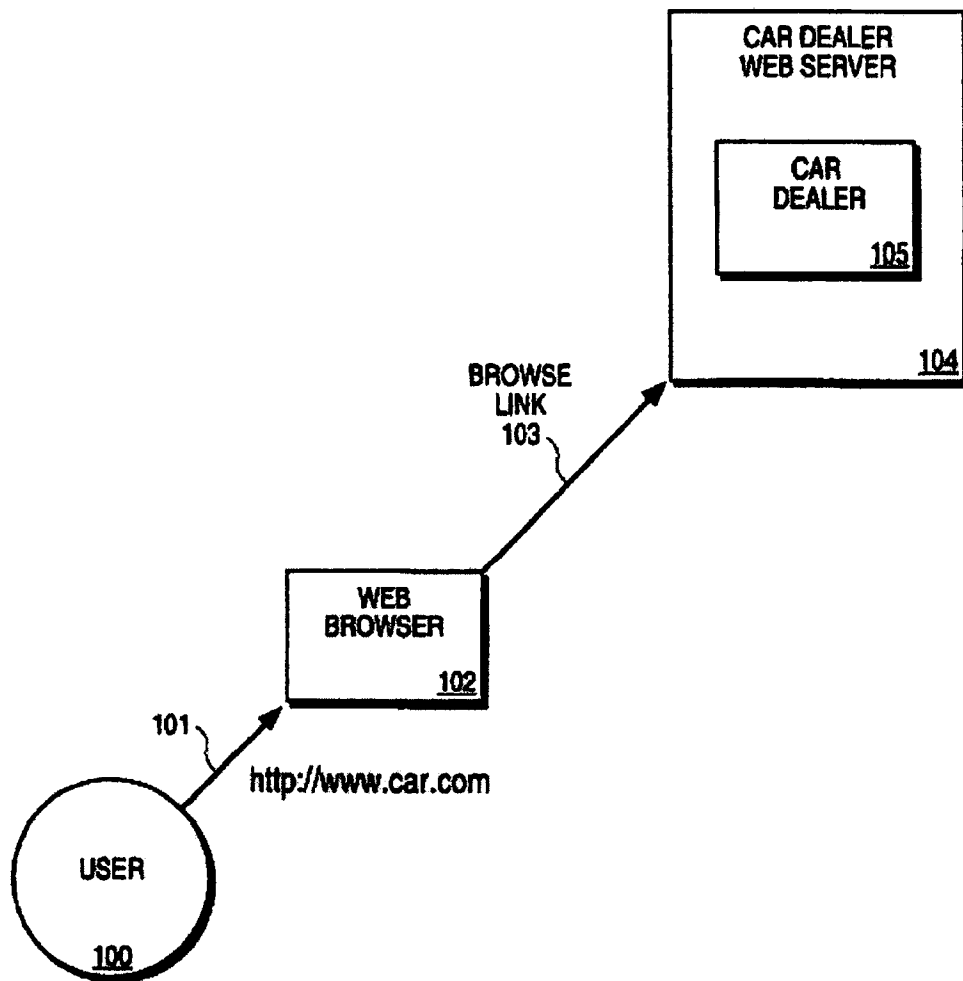
\* cited by examiner

U.S. Patent

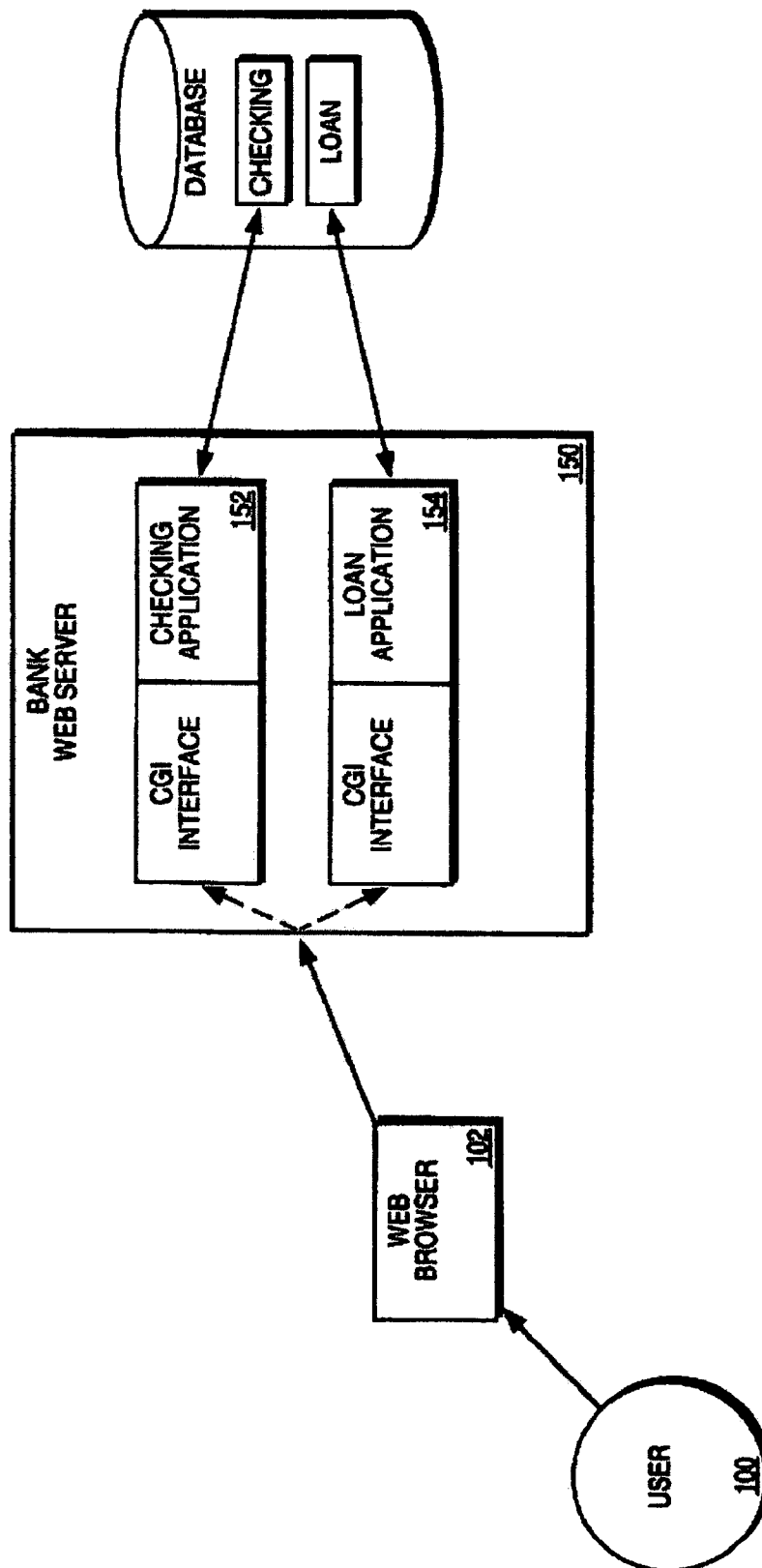
Jan. 31, 2012

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**FIG. 1A** (PRIOR ART)



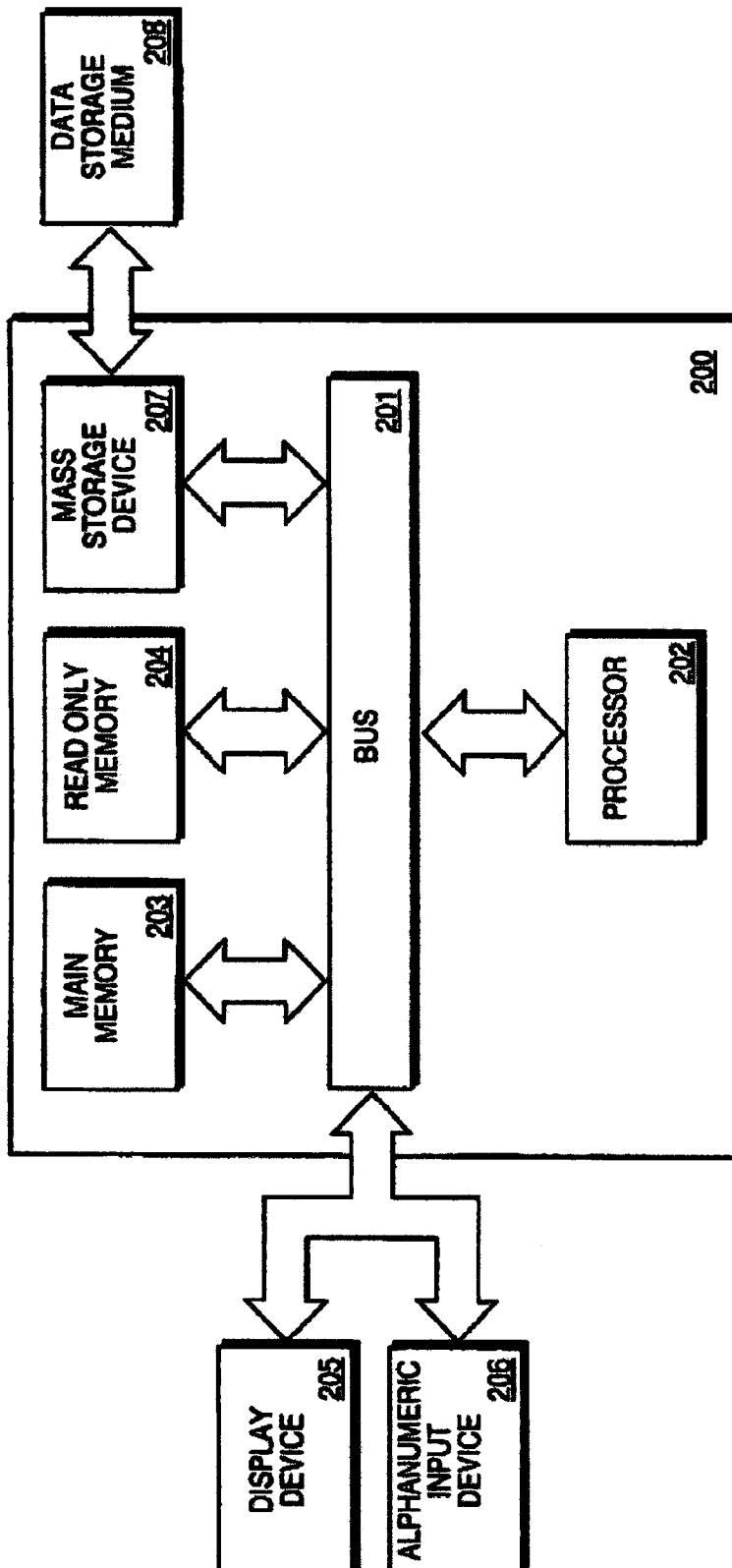
**FIG. 1B** (PRIOR ART)

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**FIG. 2**

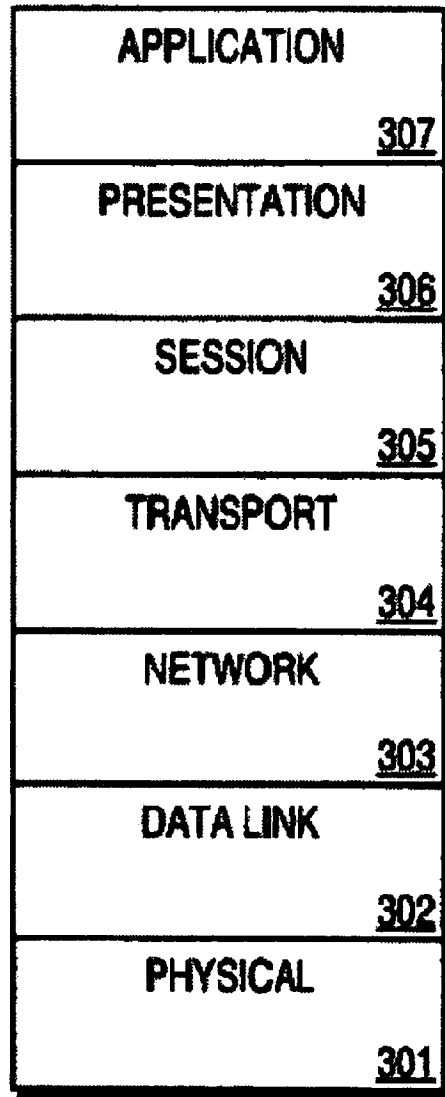
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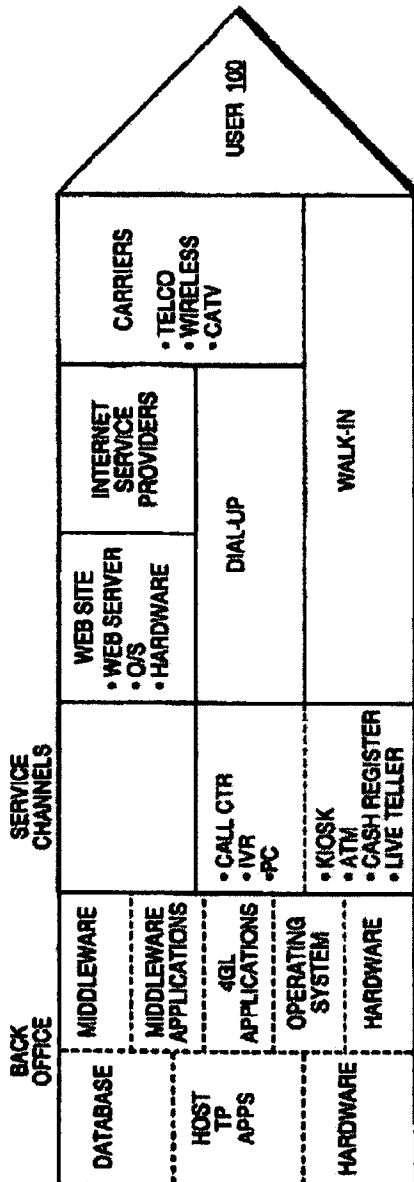
Sheet 4 of 13

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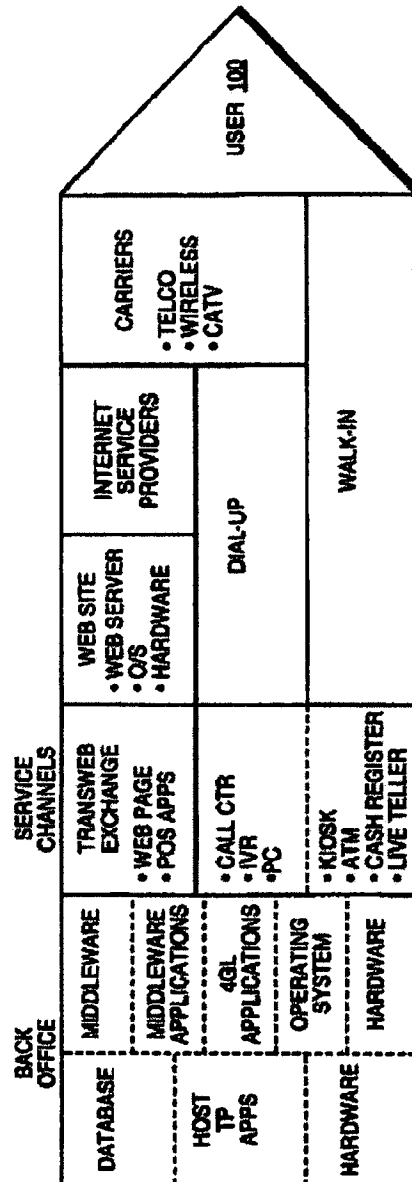
OSI MODEL  
300



**FIG. 3**



**FIG. 4A**



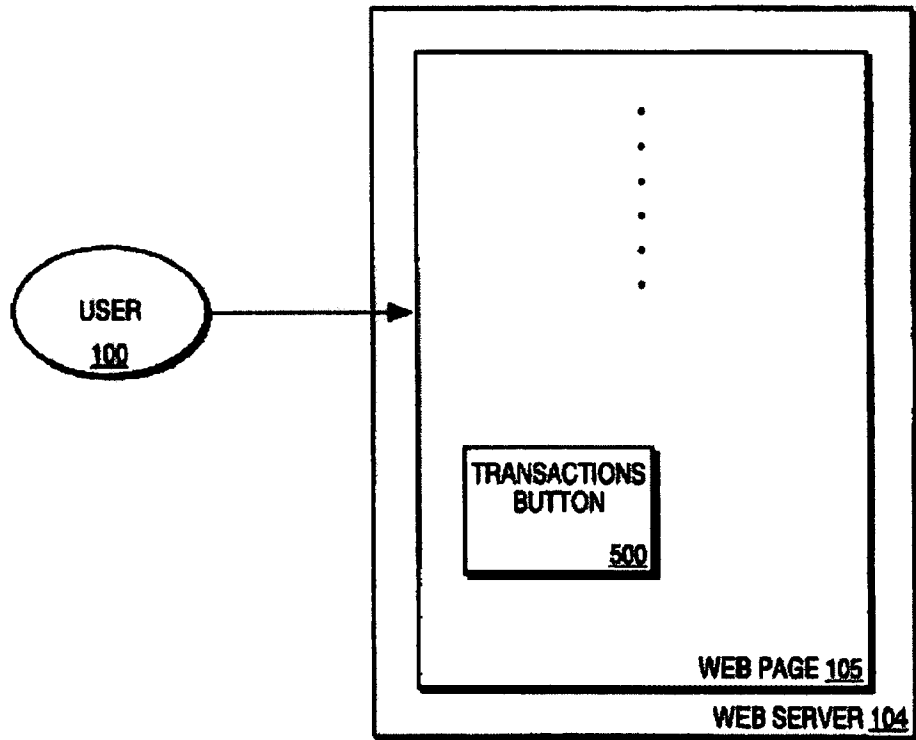
**FIG. 4B**

U.S. Patent

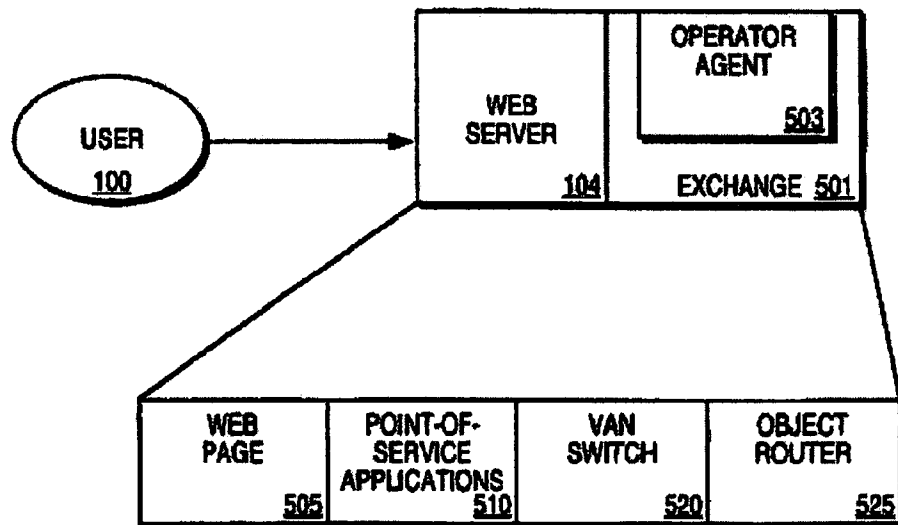
Jan. 31, 2012

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**FIG. 5A**



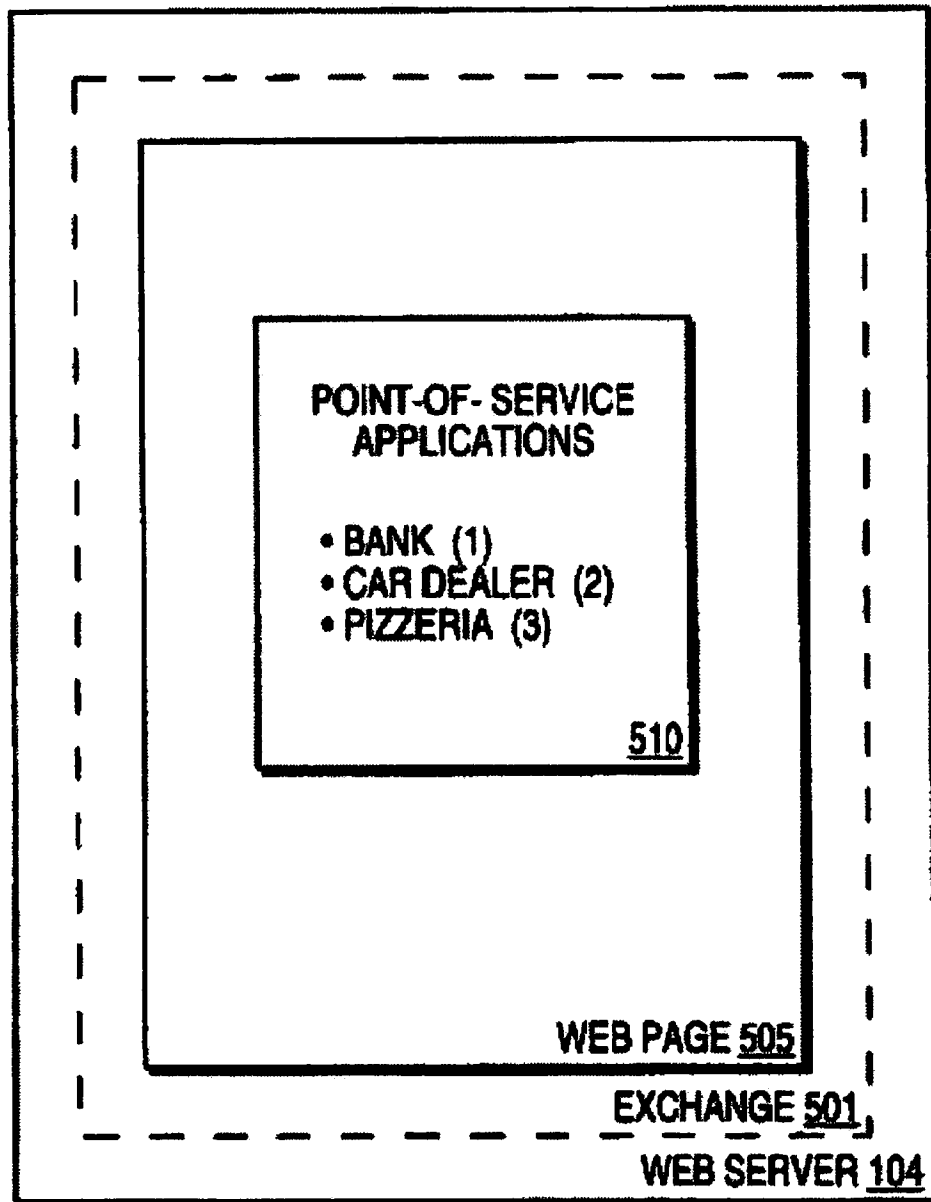
**FIG. 5B**

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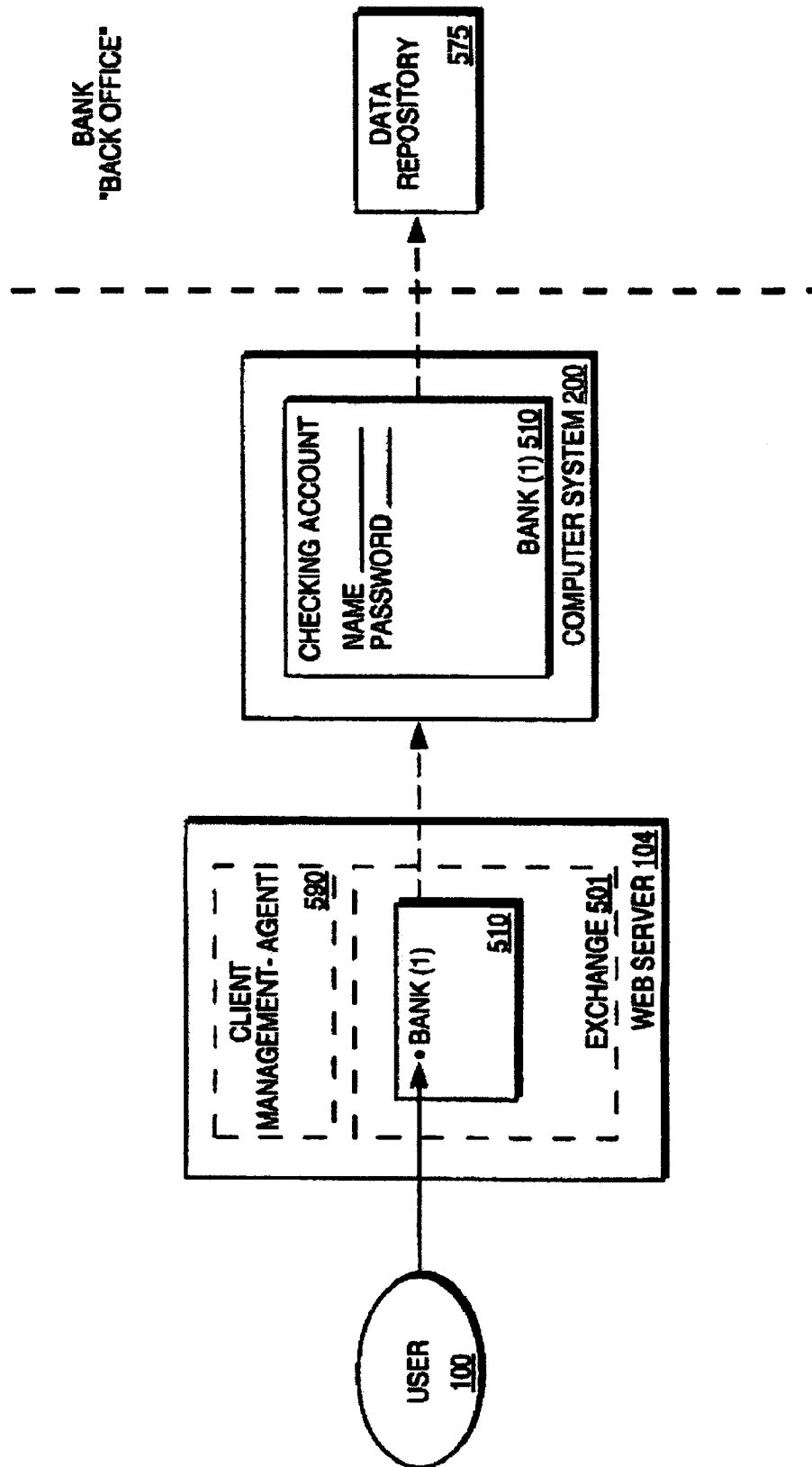
**FIG. 5C**

U.S. Patent

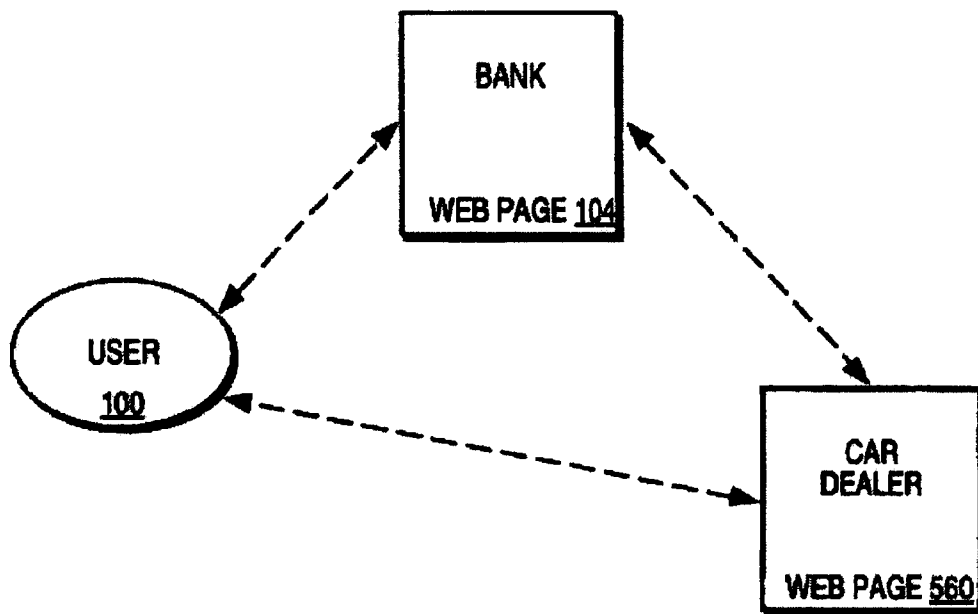
Jan. 31, 2012

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**FIG. 5D**



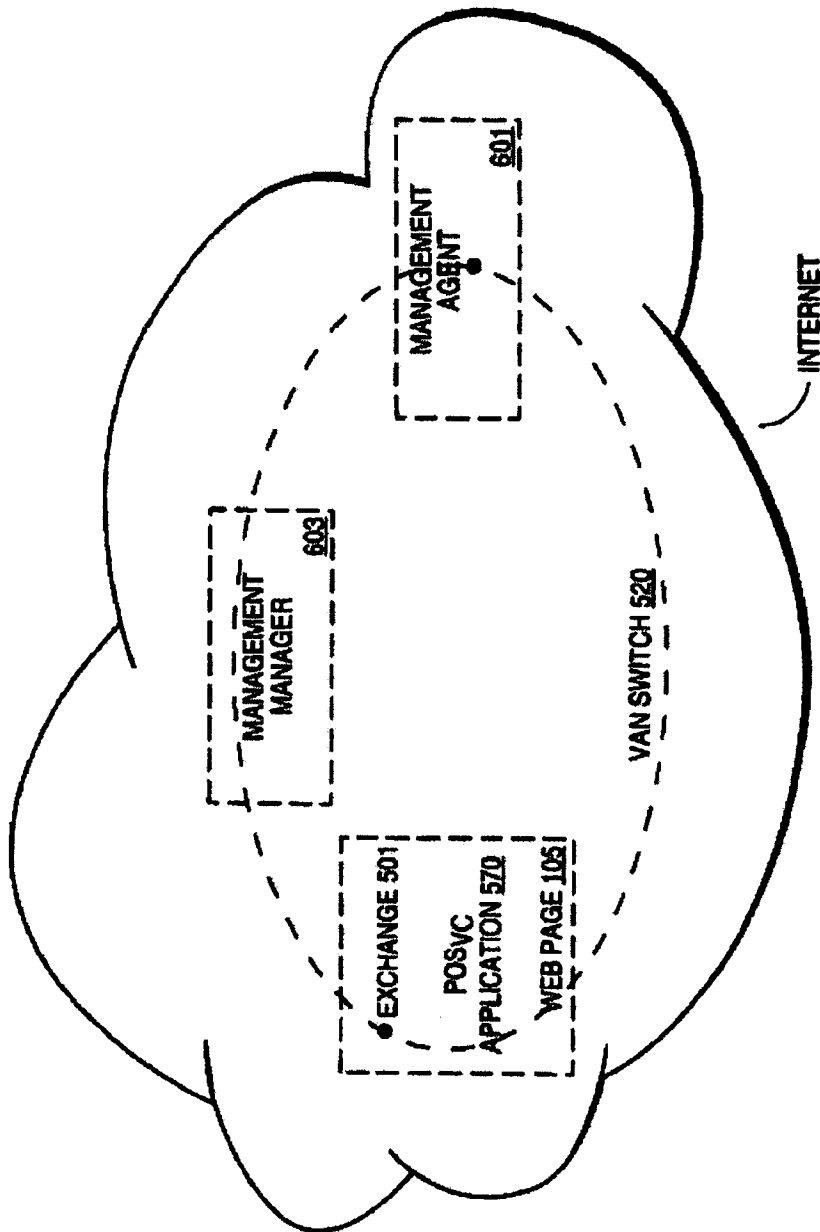
**FIG. 5E**

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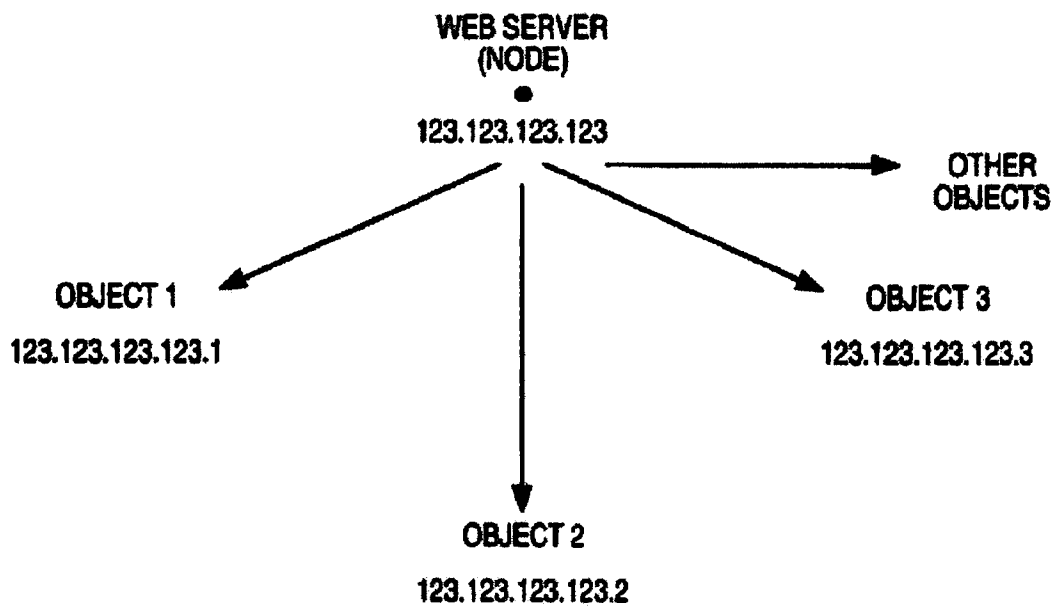
**FIG. 6A**

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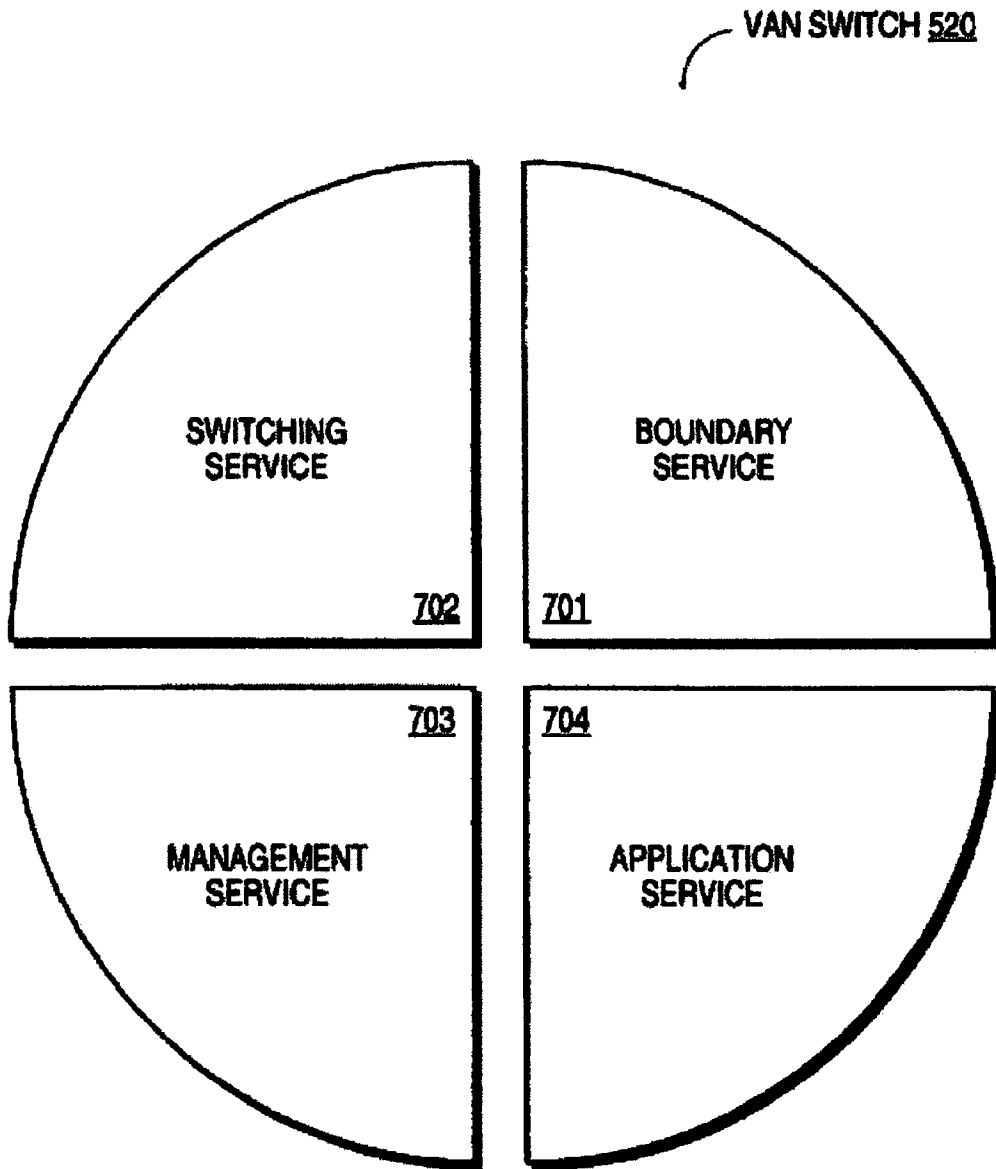
**FIG. 6B**

**U.S. Patent**

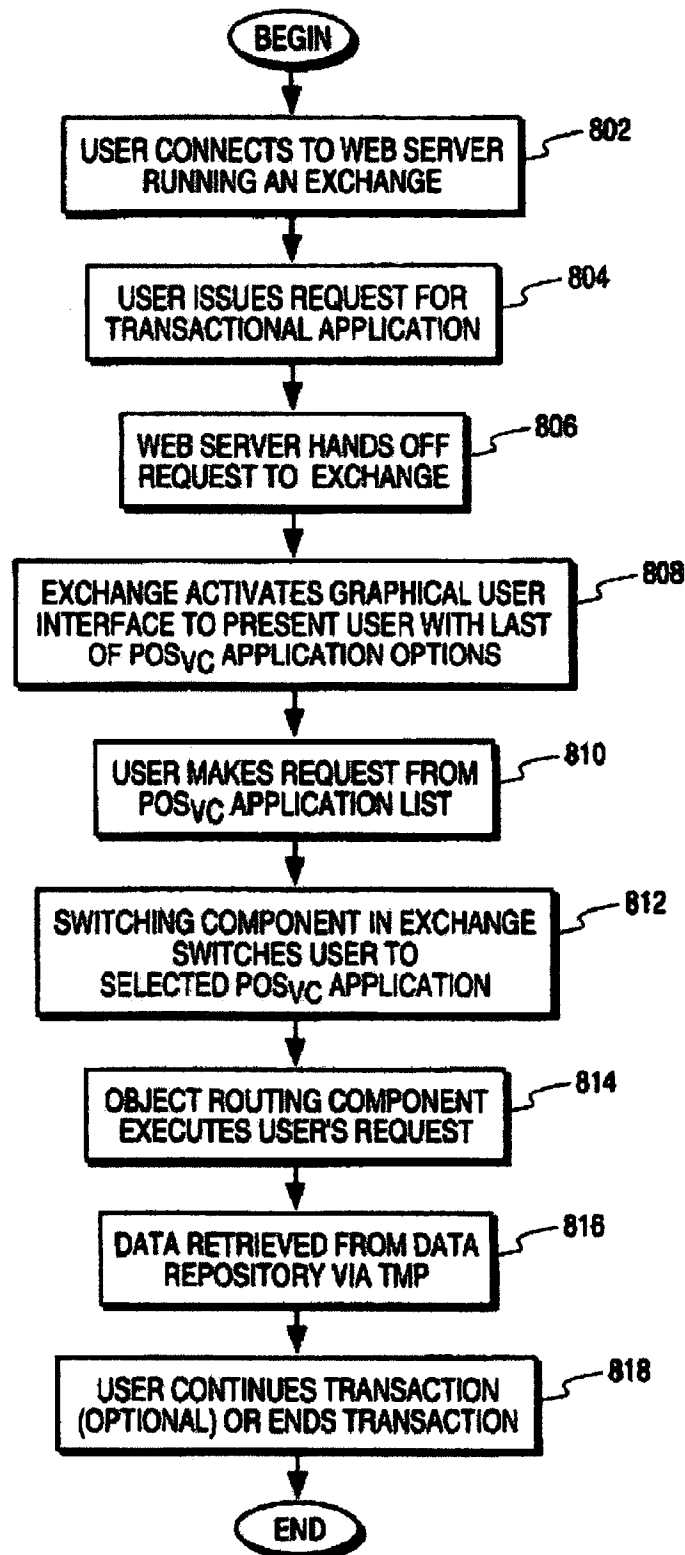
Jan. 31, 2012

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**FIG. 7**

**FIG. 8**

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**WEB APPLICATION NETWORK PORTAL****CROSS-REFERENCE TO RELATED APPLICATIONS**

This application is a divisional and claims the priority benefit of U.S. patent application Ser. No. 11/980,185 filed Oct. 30, 2007 now U.S. Pat. No. 8,037,158, which is a continuation-in-part of U.S. patent application Ser. No. 09/792,323, now U.S. Pat. No. 7,340,506, filed Feb. 23, 2001, which is a divisional of U.S. patent application Ser. No. 09/296,207, filed Apr. 21, 1999, now U.S. Pat. No. 6,212,556, which is a continuation-in-part of U.S. patent application Ser. No. 08/879,958, now U.S. Pat. No. 5,987,500, filed Jun. 20, 1997, which is a divisional and claims the priority benefit of U.S. patent application Ser. No. 08/700,726, now U.S. Pat. No. 5,778,178, filed Aug. 5, 1996, which claims the priority benefit of U.S. provisional application 60/006,634 filed Nov. 13, 1995. This application also claims benefit under 35 U.S.C. 119(e) to U.S. Provisional application Ser. No. 60/006,634 filed Nov. 13, 1995. The following applications are related applications: application Ser. Nos. 09/863,704; 12/628,066; 12/628,068; 12/628,069; 12/932,758 and 60/206,422.

**BACKGROUND****1. Field of the Invention**

The present invention relates to the area of Internet communications. Specifically, the present invention relates to a method and apparatus for configurable value-added network switching and object routing.

**2. Background of the Invention**

With the Internet and the World Wide Web ("the Web") evolving rapidly as a viable consumer medium for electronic commerce, new on-line services are emerging to fill the needs of on-line users. An Internet user today can browse on the Web via the use of a Web browser. Web browsers are software interfaces that run on Web clients to allow access to Web servers via a simple user interface. A Web user's capabilities today from a Web browser are, however, extremely limited. The user can perform one-way, browse-only interactions. Additionally, the user has limited "deferred" transactional capabilities, namely electronic mail (e-mail) capabilities. E-mail capabilities are referred to as "deferred transactions" because the consumer's request is not processed until the e-mail is received, read, and the person or system reading the e-mail executes the transaction. This transaction is thus not performed in real-time.

FIG. 1A illustrates typical user interactions on the Web today. User 100 sends out a request from Web browser 102 in the form of a universal resource locator (URL) 101 in the following manner: <http://www.car.com>. URL 101 is processed by Web browser 102 that determines the URL corresponds to car dealer Web page 105, on car dealer Web server 104. Web browser 102 then establishes browse link 103 to car dealer Web page 105. User 100 can browse Web page 105 and select "hot links" to jump to other locations in Web page 105, or to move to other Web pages on the Web. This interaction is typically a browse-only interaction. Under limited circumstances, the user may be able to fill out a form on car dealer Web page 105, and e-mail the form to car dealer Web server 104. This interaction is still strictly a one-way browse mode communications link, with the e-mail providing limited, deferred transactional capabilities.

Under limited circumstances, a user may have access to two-way services on the Web via Common Gateway Interface (CGI) applications. CGI is a standard interface for running

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external programs on a Web server. It allows Web servers to create documents dynamically when the server receives a request from the Web browser. When the Web server receives a request for a document, the Web server dynamically executes the appropriate CGI script and transmits the output of the execution back to the requesting Web browser. This interaction can thus be termed a "two-way" transaction. It is a severely limited transaction, however, because each CGI application is customized for a particular type of application or service.

For example, as illustrated in FIG. 1B, user 100 may access bank 150's Web server and attempt to perform transactions on checking account 152 and to make a payment on loan account 154. In order for user 100 to access checking account 152 and loan account 154 on the Web, CGI application scripts must be created for each account, as illustrated in FIG. 1B. The bank thus has to create individual scripts for each of its services to offer users access to these services. User 100 can then interact in a limited fashion with these individual applications. Creating and managing individual CGI scripts for each service is not a viable solution for merchants with a large number of services.

As the Web expands and electronic commerce becomes more desirable, the need increases for robust, real-time, bi-directional transactional capabilities on the Web. A true real-time, bi-directional transaction would allow a user to connect to a variety of services on the Web, and perform real-time transactions on those services. For example, although user 100 can browse car dealer Web page 105 today, the user cannot purchase the car, negotiate a car loan or perform other types of real-time, two-way transactions that he can perform with a live salesperson at the car dealership. Ideally, user 100 in FIG. 1A would be able to access car dealer Web page 105, select specific transactions that he desires to perform, such as purchase a car, and perform the purchase in real-time, with two-way interaction capabilities. CGI applications provide user 100 with a limited ability for two-way interaction with car dealer Web page 105, but due to the lack of interaction and management between the car dealer and the bank, he will not be able to obtain a loan and complete the purchase of the car via a CGI application. The ability to complete robust real-time, two-way transactions is thus not truly available on the Web today.

**SUMMARY OF THE INVENTION**

It is therefore an object of the present invention to provide a method and apparatus for providing real-time, two-way transactional capabilities on the Web. Specifically, one embodiment of the present invention discloses a configurable value-added network switch for enabling real-time transactions on the World Wide Web. The configurable value added network switch comprises means for switching to a transactional application in response to a user specification from a World Wide Web application, means for transmitting a transaction request from the transactional application, and means for processing the transaction request.

According to another aspect of the present invention, a method and apparatus for enabling object routing on the World Wide Web is disclosed. The method for enabling object routing comprises the steps of creating a virtual information store containing information entries and attributes, associating each of the information entries and the attributes with an object identity, and assigning a unique network address to each of the object identities.

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Other objects, features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description of the present invention as set forth below.

FIG. 1A is an illustration of a current user's browse capabilities on the Web via a Web browser.

FIG. 1B is an illustration of a current user's capabilities to perform limited transactions on the Web via CGI applications.

FIG. 2 illustrates a typical computer system on which the present invention may be utilized.

FIG. 3 illustrates the Open Systems Interconnection (OSI) Model.

FIG. 4A illustrates conceptually the user value chain as it exists today.

FIG. 4B illustrates one embodiment of the present invention.

FIG. 5A illustrates a user accessing a Web server including one embodiment of the present invention.

FIG. 5B illustrates the exchange component according to one embodiment of the present invention.

FIG. 5C illustrates an example of a point-of-service (POSvc) application list.

FIG. 5D illustrates a user selecting a bank POSvc application from the POSvc application list.

FIG. 5E illustrates a three-way transaction according to one embodiment of the present invention.

FIG. 6A illustrates a value-added network (VAN) switch.

FIG. 6B illustrates the hierarchical addressing tree structure of the networked objects in DOLSIBs.

FIG. 7 illustrates conceptually the layered architecture of a VAN switch.

FIG. 8 is a flow diagram illustrating one embodiment of the present invention.

#### DETAILED DESCRIPTION

The present invention relates to a method and apparatus for configurable value-added network switching and object routing and management. "Web browser" as used in the context of the present specification includes conventional Web browsers such as NCSA Mosaic™ from NCSA and Netscape Mosaic™ from Netscape™. The present invention is independent of the Web browser being utilized and the user can use any Web browser, without modifications to the Web browser. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent to one of ordinary skill in the art, however, that these specific details need not be used to practice the present invention. In other instances, well-known structures, interfaces and processes have not been shown in detail in order not to unnecessarily obscure the present invention.

FIG. 2 illustrates a typical computer system 200 in which the present invention operates. The preferred embodiment of the present invention is implemented on an IBM™ Personal Computer manufactured by IBM Corporation of Armonk, N.Y. Alternate embodiments may be implemented on a Macintosh™ computer manufactured by Apple™ Computer, Incorporated of Cupertino, Calif. It will be apparent to those

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of ordinary skill in the art that other alternative computer system architectures may also be employed.

In general, such computer systems as illustrated by FIG. 2 comprise a bus 201 for communicating information, a processor 202 coupled with the bus 201 for processing information, main memory 203 coupled with the bus 201 for storing information and instructions for the processor 202, a read-only memory 204 coupled with the bus 201 for storing static information and instructions for the processor 202, a display device 205 coupled with the bus 201 for displaying information for a computer user, an input device 206 coupled with the bus 201 for communicating information and command selections to the processor 202, and a mass storage device 207, such as a magnetic disk and associated disk drive, coupled with the bus 201 for storing information and instructions. A data storage medium 208 containing digital information is configured to operate with mass storage device 207 to allow processor 202 access to the digital information on data storage medium 208 via bus 201.

Processor 202 may be any of a wide variety of general purpose processors or microprocessors such as the Pentium™ microprocessor manufactured by Intel™ Corporation or the Motorola™ 68040 or Power PC™ brand microprocessor manufactured by Motorola™ Corporation. It will be apparent to those of ordinary skill in the art, however, that other varieties of processors may also be used in a particular computer system. Display device 205 may be a liquid crystal device, cathode ray tube (CRT), or other suitable display device. Mass storage device 207 may be a conventional hard disk drive, floppy disk drive, CD-ROM drive, or other magnetic or optical data storage device for reading and writing information stored on a hard disk, a floppy disk, a CD-ROM, a magnetic tape, or other magnetic or optical data storage medium. Data storage medium 208 may be a hard disk, a floppy disk, a CD-ROM, a magnetic tape, or other magnetic or optical data storage medium.

In general, processor 202 retrieves processing instructions and data from a data storage medium 208 using mass storage device 207 and downloads this information into random access memory 203 for execution. Processor 202, then executes an instruction stream from random access memory 203 or read-only memory 204. Command selections and information input at input device 206 are used to direct the flow of instructions executed by processor 202. Equivalent input device 206 may also be a pointing device such as a conventional mouse or trackball device. The results of this processing execution are then displayed on display device 205.

The preferred embodiment of the present invention is implemented as a software module, which may be executed on a computer system such as computer system 200 in a conventional manner. Using well known techniques, the application software of the preferred embodiment is stored on data storage medium 208 and subsequently loaded into and executed within computer system 200. Once initiated, the software of the preferred embodiment operates in the manner described below.

FIG. 3 illustrates the Open Systems Interconnection (OSI) reference model. OSI Model 300 is an international standard that provides a common basis for the coordination of standards development, for the purpose of systems interconnection. The present invention is implemented to function as a routing switch within the "application layer" of the OSI model. The model defines seven layers, with each layer communicating with its peer layer in another node through the use of a protocol. Physical layer 301 is the lowest layer, with responsibility to transmit unstructured bits across a link. Data

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link layer 302 is the next layer above physical layer 301. Data link layer 302 transmits chunks across the link and deals with problems like checksumming to detect data corruption, orderly coordination of the use of shared media and addressing when multiple systems are reachable. Network bridges operate within data link layer 302.

Network layer 303 enables any pair of systems in the network to communicate with each other. Network layer 303 contains hardware units such as routers that handle routing, packet fragmentation and reassembly of packets. Transport layer 304 establishes a reliable communication stream between a pair of systems, dealing with errors such as lost packets, duplicate packets, packet reordering and fragmentation. Session layer 305 offers services above the simple communication stream provided by transport layer 304. These services include dialog control and chaining. Presentation layer 306 provides a means by which OSI compliant applications can agree on representations for data. Finally, application layer 307 includes services such as file transfer, access and management services (FTAM), electronic mail and virtual terminal (VT) services. Application layer 307 provides a means for application programs to access the OSI environment. As described above, the present invention is implemented to function as a routing switch in application layer 307. Application layer routing creates an open channel for the management, and the selective flow of data from remote databases on a network.

#### A. Overview

FIG. 4A illustrates conceptually the user value chain as it exists today. The user value chain in FIG. 4A depicts the types of transactions that are performed today, and the channels through which the transactions are performed. A "transaction" for the purposes of the present invention includes any type of commercial or other type of interaction that a user may want to perform. Examples of transactions include a deposit into a bank account, a request for a loan from a bank, a purchase of a car from a car dealership or a purchase of a car with financing from a bank. A large variety of other transactions are also possible.

A typical user transaction today may involve user 100 walking into a bank or driving up to a teller machine, and interacting with a live bank teller, or automated teller machine (ATM) software applications. Alternatively, user 100 can perform the same transaction by using a personal computer (PC), activating application software on his PC to access his bank account, and dialing into the bank via a modem line. If user 100 is a Web user, however, there is no current mechanism for performing a robust, real-time transaction with the bank, as illustrated in FIG. 4A. CGI scripts provide only limited two-way capabilities, as described above. Thus, due to this lack of a robust mechanism by which real-time Web transactions can be performed, the bank is unable to be a true "Web merchant," namely a merchant capable of providing complete transactional services on the Web.

According to one embodiment of the present invention, as illustrated in FIG. 4B, each merchant that desires to be a Web merchant can provide real-time transactional capabilities to users who desire to access the merchants' services via the Web. This embodiment includes a service network running on top of a facilities network, namely the Internet, the Web or e-mail networks. For the purposes of this application, users are described as utilizing PC's to access the Web via Web server "switching" sites. (Switching is described in more detail below). Users may also utilize other personal devices such as network computers or cellular devices to access the merchants' services via appropriate switching sites. These switching sites include non-Web network computer sites and

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cellular provider sites. Five components interact to provide this service network functionality, namely an exchange, an operator agent, a management agent, a management manager and a graphical user interface. All five components are described in more detail below.

As illustrated in FIG. 5A, user 100 accesses Web server 104. Having accessed Web server 104, user 100 can decide that he desires to perform real-time transactions. When Web server 104 receives user 100's indication that he desires to perform real-time transactions, the request is handed over to an exchange component. Thus, from Web page 105, for example, user 100 can select button 500, entitled "Transactions" and Web server 104 hands user 100's request over to the exchange component. The button and the title can be replaced by any mechanism that can instruct a Web server to hand over the consumer's request to the exchange component.

FIG. 5B illustrates exchange 501. Exchange 501 comprises Web page 505 and point-of-service (POSvc) applications 510. Exchange 501 also conceptually includes a switching component and an object routing component (described in more detail below). POSvc applications 510 are transactional applications, namely applications that are designed to incorporate and take advantage of the capabilities provided by the present invention. Although exchange 501 is depicted as residing on Web server 104, the exchange can also reside on a separate computer system that resides on the Internet and has an Internet address. Exchange 501 may also include operator agent 503 that interacts with a management manager (described in more detail below). Exchange 501 creates and allows for the management (or distributed control) of a service network, operating within the boundaries of an IP-based facilities network. Thus, exchange 501 and a management agent component, described in more detail below, under the headings "VAN Switch and Object Routing," together perform the switching, object routing, application and service management functions according to one embodiment of the present invention.

Exchange 501 processes the consumer's request and displays an exchange Web page 505 that includes a list of POSvc applications 510 accessible by exchange 501. A POSvc application is an application that can execute the type of transaction that the user may be interested in performing. The POSvc list is displayed via the graphical user interface component. One embodiment of the present invention supports Hyper-Text Markup Language as the graphical user interface component. Virtual Reality Markup Language and Java™ are also supported by this embodiment. A variety of other graphical user interface standards can also be utilized to implement the graphical user interface.

An example of a POSvc application list is illustrated in FIG. 5C. User 100 can thus select from POSvc applications Bank 510(1), Car Dealer 510(2) or Pizzeria 510(3). Numerous other POSvc applications can also be included in this selection. If user 100 desires to perform a number of banking transactions, and selects the Bank application, a Bank POSvc application will be activated and presented to user 100, as illustrated in FIG. 5D. For the purposes of illustration, exchange 501 in FIG. 5D is shown as running on a different computer system (Web server 104) from the computer systems of the Web merchants running POSvc applications (computer system 200). Exchange 501 may, however, also be on the same computer system as one or more of the computer systems of the Web merchants.

Once Bank POSvc application 510 has been activated, user 100 will be able to connect to Bank services and utilize the application to perform banking transactions, thus accessing

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data from a host or data repository 575 in the Bank "Back Office." The Bank Back Office comprises legacy databases and other data repositories that are utilized by the Bank to store its data. This connection between user 100 and Bank services is managed by exchange 501. As illustrated in FIG. 5D, once the connection is made between Bank POSvc application 510(1), for example, and Bank services, an operator agent on Web server 104 may be activated to ensure the availability of distributed functions and capabilities.

Each Web merchant may choose the types of services that it would like to offer its clients. In this example, if Bank decided to include in their POSvc application access to checking and savings accounts, user 100 will be able to perform real-time transactions against his checking and savings accounts. Thus, if user 100 moves \$500 from his checking account into his savings account, the transaction will be performed in real-time, in the same manner the transaction would have been performed by a live teller at the bank or an ATM machine. Therefore, unlike his prior access to his account, user 100 now has the capability to do more than browse his bank account. The ability to perform these types of robust, real-time transactions from a Web client is a significant aspect of the present invention.

Bank can also decide to provide other types of services in POSvc application 510(1). For example, Bank may agree with Car dealership to allow Bank customers to purchase a car from that dealer, request a car loan from Bank, and have the entire transaction performed on the Web, as illustrated in FIG. 5E. In this instance, the transactions are not merely two-way, between the user and Bank, but three-way, amongst the consumer, Bank and Car dealership. According to one aspect of the present invention, this three-way transaction can be expanded to n-way transactions, where n represents a predetermined number of merchants or other service providers who have agreed to cooperate to provide services to users. The present invention therefore allows for "any-to-any" communication and transactions on the Web, thus facilitating a large, flexible variety of robust, real-time transactions on the Web.

Finally, Bank may also decide to provide intra-merchant or intra-bank services, together with the inter-merchant services described above. For example, if Bank creates a POSvc application for use by the Bank Payroll department, Bank may provide its own employees with a means for submitting timecards for payroll processing by the Bank's Human Resources (HR) Department. An employee selects the Bank HR POSvc application, and submits his timecard. The employee's timecard is processed by accessing the employee's payroll information, stored in the Bank's Back Office. The transaction is thus processed in real-time, and the employee receives his paycheck immediately.

#### B. Van Switching and Object Routing

As described above, exchange 501 and management agent 601, illustrated in FIG. 6A, together constitute a value-added network (VAN) switch. These two elements may take on different roles as necessary, including peer-to-peer, client-server or master-slave roles. Management manager 603 is illustrated as residing on a separate computer system on the Internet. Management manager 603 can, however, also reside on the same machine as exchange 501. Management manager 603 interacts with the operator agent 503 residing on exchange 501.

VAN switch 520 provides multi-protocol object routing, depending upon the specific VAN services chosen. This multi-protocol object routing is provided via a proprietary protocol, TransWeb™ Management Protocol (TMP). TMP incorporates the same security features as the traditional Simple Network Management Protocol, SNMP. It also allows

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for the integration of other traditional security mechanisms, including RSA security mechanisms.

One embodiment of the present invention utilizes TMP and distributed on-line service information bases (DOLSIBs) to perform object routing. Alternatively, TMP can incorporate s-HTTP, Java™, the WinSock API or ORB with DOLSIBs to perform object routing. DOLSIBs are virtual information stores optimized for networking. All information entries and attributes in a DOLSIB virtual information store are associated with a networked object identity. The networked object identity identifies the information entries and attributes in the DOLSIB as individual networked objects, and each networked object is assigned an Internet address. The Internet address is assigned based on the IP address of the node at which the networked object resides.

For example, in FIG. 5A, Web server 104 is a node on the Internet, with an IP address. All networked object associated with Web server 104 will therefore be assigned an Internet address based on the Web server 104's IP address. These networked objects thus "branch" from the node, creating a hierarchical tree structure. The Internet address for each networked object in the tree essentially establishes the individual object as an "IP-reachable" or accessible node on the Internet. TMP utilizes this Internet address to uniquely identify and access the object from the DOLSIB. FIG. 6B illustrates an example of this hierarchical addressing tree structure.

Each object in the DOLSIB has a name, a syntax and an encoding. The name is an administratively assigned object ID specifying an object type. The object type together with the object instance serves to uniquely identify a specific instantiation of the object. For example, if object 610 is information about models of cars, then one instance of that object would provide user 100 with information about a specific model of the car while another instance would provide information about a different model of the car. The syntax of an object type defines the abstract data structure corresponding to that object type. Encoding of objects defines how the object is represented by the object type syntax while being transmitted over the network.

#### C. Management and Administration

As described above, exchange 501 and management agent 601 together constitute a VAN switch. FIG. 7 illustrates conceptually the layered architecture of VAN switch 520. Specifically, boundary service 701 provides the interfaces between VAN switch 520, the Internet and the Web, and multi-media end user devices such as PCs, televisions or telephones. Boundary service 701 also provides the interface to the on-line service provider. A user can connect to a local application, namely one accessible via a local VAN switch, or be routed or "switched" to an application accessible via a remote VAN switch.

Switching service 702 is an OSI application layer switch. Switching service 702 thus represents the core of the VAN switch. It performs a number of tasks including the routing of user connections to remote VAN switches, described in the paragraph above, multiplexing and prioritization of requests, and flow control. Switching service 702 also facilitates open systems' connectivity with both the Internet (a public switched network) and private networks including back office networks, such as banking networks. Interconnected application layer switches form the application network backbone. These switches are one significant aspect of the present invention.

Management service 703 contains tools such as Information Management Services (IMS) and application Network Management Services (NMS). These tools are used by the end users to manage network resources, including VAN

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switches. Management service 703 also provides applications that perform Operations, Administration, Maintenance & Provisioning (OAM&P) functions. These OAM&P functions include security management, fault management, configuration management, performance management and billing management. Providing OAM&P functions for applications in this manner is another significant aspect of the present invention.

Finally, application service 704 contains application programs that deliver customer services. Application service 704 includes POSvc applications such as Bank POSvc described above, and illustrated in FIG. 6A. Other examples of VAN services include multi-media messaging, archival/retrieval management, directory services, data staging, conferencing, financial services, home banking, risk management and a variety of other vertical services. Each VAN service is designed to meet a particular set of requirements related to performance, reliability, maintenance and ability to handle expected traffic volume. Depending on the type of service, the characteristics of the network elements will differ. VAN service 704 provides a number of functions including communications services for both managers and end users of the network and control for the user over the user's environment.

FIG. 8 is a flow diagram illustrating one embodiment of the present invention. A user connects to a Web server running an exchange component in step 802. In step 804, the user issues a request for a transactional application, and the web server hands off the request to an exchange in step 806. The exchange activates a graphical user interface to present user with a list of POSvc application options in step 808. In step 810, the user makes a selection from the POSvc application list. In step 812, the switching component in the exchange switches the user to the selected POSvc application, and in step 814, the object routing component executes the user's request. Data is retrieved from the appropriate data repository via TMP in step 816, and finally, the user may optionally continue the transaction in step 818 or end the transaction.

Thus, a configurable value-added network switching and object routing method and apparatus is disclosed. These specific arrangements and methods described herein are merely illustrative of the principles of the present invention. Numerous modifications in form and detail may be made by those of ordinary skill in the art without departing from the scope of the present invention. Although this invention has been shown in relation to a particular preferred embodiment, it should not be considered so limited. Rather, the present invention is limited only by the scope of the appended claims.

What is claimed is:

1. A system, comprising:

- a Web server, including a processor and a memory, for offering one or more Web applications as respective point-of-service applications in a point-of-service application list on a Web page;
- each Web application of the one or more Web applications for requesting a real-time Web transaction;
- a value-added network (VAN) switch running on top of a facilities network selected from a group consisting of the World Wide Web, the Internet and an e-mail network, the VAN switch for enabling the real-time Web transactions from the one or more Web applications;
- a service network running on top of the facilities network for connecting through the Web server to a back-end transactional application; and
- a computer system executing the Back-end transactional application for processing the transaction request in real-time.

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2. The system of claim 1, wherein the VAN switch is an application layer switch in the application layer of the OSI model.

3. The system of claim 1, wherein the VAN switch enables the switching to Web merchant services in response to a Web server's receipt of a selection of one of the point-of-service Web applications corresponding to the Web merchant services from the point-of-service application list on the Web page.

4. The system of claim 1, wherein each Web merchant service includes one of the one or more Web applications offered as a VAN service, utilizing the VAN switch.

5. The system of claim 1, wherein each Web application of the one or more Web applications is a value-added network (VAN) service or online service atop the Web, utilizing the VAN switch.

6. The system of claim 1, wherein the service network includes the one or more Web applications and wherein the service network manages the flow of real-time Web transactions from the one or more Web applications and includes the VAN switch.

7. The system of claim 1, wherein the Web server is configured to receive a Web transaction request and wherein the Web transaction request is a request to perform one of the real-time Web transactions from one of the one or more Web applications, utilizing the VAN switch.

8. The system of claim 1, further comprising:

- a computer system executing a back-end transactional application for processing the transaction request in real-time, wherein said computer system includes a data repository, wherein the data repository is a data repository to store banking data, and wherein retrieving data includes retrieving banking data to complete a real-time Web banking transaction as one of the real-time Web transactions from a banking Web application as one of the one or more Web applications.

9. The system of claim 1, further comprising the one or more Web applications offered as software-as-a-service atop the Web.

10. A method for performing real-time Web transactions from a Web application, comprising:

- receiving a request at a Web server, including a processor and a memory, for a real-time Web transaction from a Web application on a Web page, wherein the Web server is configured to hand over the request to a Value Added Network (VAN) switch;
- offering a plurality of Web applications including the Web application on a Web page, upon receipt from a Web server a selection of the Web application from the offered Web applications, the Web application corresponding to a respective back-end transactional application, wherein the back-end transactional application is an application running at the back-office server of one or more Web merchants or at the back-end;
- receiving a request for Web merchant services upon receipt by a Web server a selection of the Web application, wherein the request for Web merchant services is a request to connect to the selected back-end transactional application to perform an interactive real-time Web transaction from the Web application, wherein the transactional application is an on-line service provided by one or more Web merchants or the back-end;
- switching utilizing the VAN switch to the back-end transactional application in response to receiving the request from the Web server;

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providing distributed control of a service network, operating within the boundaries of an IP-based facilities network;

connecting to specified ones of the Web merchant services or to back-end services, wherein the connection to the Web merchant services or back-end transactional services is managed;

accessing data from a host or data repository coupled to the back office server of one or more Web merchants or to the back-end transactional application, wherein the back office server or back-end is coupled to legacy databases and other data repositories that are utilized by the one or more of the Web merchants or the back-end transactional application to store data; and

completing the real-time Web transactions from the Web application.

11. The method of claim 10, wherein the real-time Web transactions are Web transactions from the Web application accessing a value-added network service.

12. A computer-implemented system, operated by a business entity comprising:

a Web application network portal, wherein the portal includes memory and a processor and one or more Web applications offered respectively by one or more Web merchants or other service providers, or by multiple sub-entities of the business entity who have agreed to cooperate to provide on-line Value Added Network (VAN) services atop the Web for access by employees of the business entity;

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a list of one or more point-of-service employee Web applications on a Web page offered by the business entity that operates the portal, said portal allowing access to the one or more point-of-service applications on the Web page from said list, and wherein the portal offers the one or more point-of-service applications as on-line services on the Web page, and further wherein the portal is operated by the business entity over a service network running on top of a facilities network, the facilities network being selected from a group consisting of: the World Wide Web, the Internet and email networks, said service network including a VAN Switch;

one or more back-end transactional applications running at one or more back-end host computers, corresponding, respectively to the one or more point-of-service applications accessed, to complete a real-time Web transaction from the Web application on the Web page.

13. The portal of claim 12, wherein the one or more Web applications include a plurality of point-of-service applications on the Web page, wherein the business entity and the sub-entities offer Web applications which are selected from a group consisting of payroll Web applications, human resources Web applications, expense report Web applications, time card Web applications, travel Web applications, vacation Web applications, financial Web applications and sales commission Web applications.

\* \* \* \* \*



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**United States Patent**

[19]

[11]

**Patent Number: 5,987,500****Arunachalam**

[45]

**Date of Patent: \*Nov. 16, 1999**

[54] **VALUE-ADDED NETWORK SYSTEM FOR ENABLING REAL-TIME, BY-DIRECTIONAL TRANSACTIONS ON A NETWORK**

[75] Inventor: **Lakshmi Arunachalam**, Menlo Park, Calif.

[73] Assignee: **Pi-Net International, Inc.**, Menlo Park, Calif.

[\*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

[21] Appl. No.: **08/879,958**

[22] Filed: **Jun. 20, 1997**

**Related U.S. Application Data**

[62] Division of application No. 08/700,726, Aug. 5, 1996, Pat. No. 5,778,178

[60] Provisional application No. 60/006,634, Nov. 13, 1995.

[51] Int. Cl.<sup>6</sup> ..... **G06F 13/00**

[52] U.S. Cl. .... **709/203**

[58] Field of Search ..... 364/DIG. 1, DIG. 2; 395/762, 200.3, 200.31, 200.32, 200.43, 681, 682, 683, 684, 685, 689; 709/200, 201, 202, 203, 213, 301, 302, 303, 304, 305; 710/200

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"Coding with HTML forms: HTML goes interactive", Andrew Davidson, Dr. Dobb's Journal, V20, N6, Jun. 1995, p. 16.

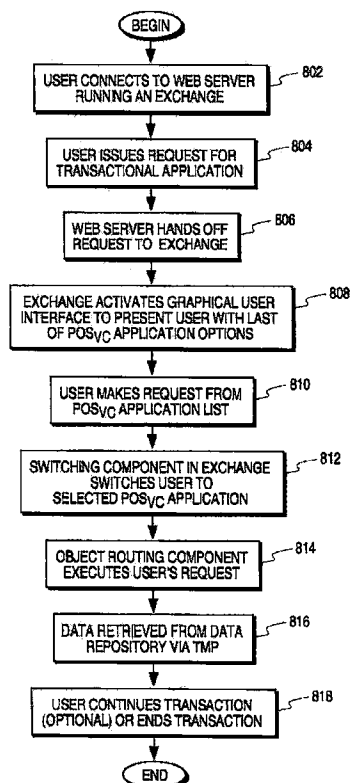
*Primary Examiner*—Robert B. Harrell

*Attorney, Agent, or Firm*—Blakely, Sokoloff, Taylor & Zafman LLP

[57] **ABSTRACT**

The present invention provides a method and apparatus for providing real-time, two-way transactional capabilities on the Web. Specifically, one embodiment of the present invention discloses a configurable value-added network switch for enabling real-time transactions on the World Wide Web. The configurable value added network switch comprises a system for switching to a transactional application in response to a user specification from a World Wide Web application, a system means for transmitting a transaction request from the transactional application, and a system for processing the transaction request. Additionally, a method for enabling object routing is disclosed, comprising the steps of creating a virtual information store containing information entries and attributes associating each of the information entries and the attributes with an object identity, and assigning a unique network address to each of the object identities. Finally, a method is disclosed for enabling service management of the value-added network service, to perform OAM&P functions on the services network.

**35 Claims, 13 Drawing Sheets**



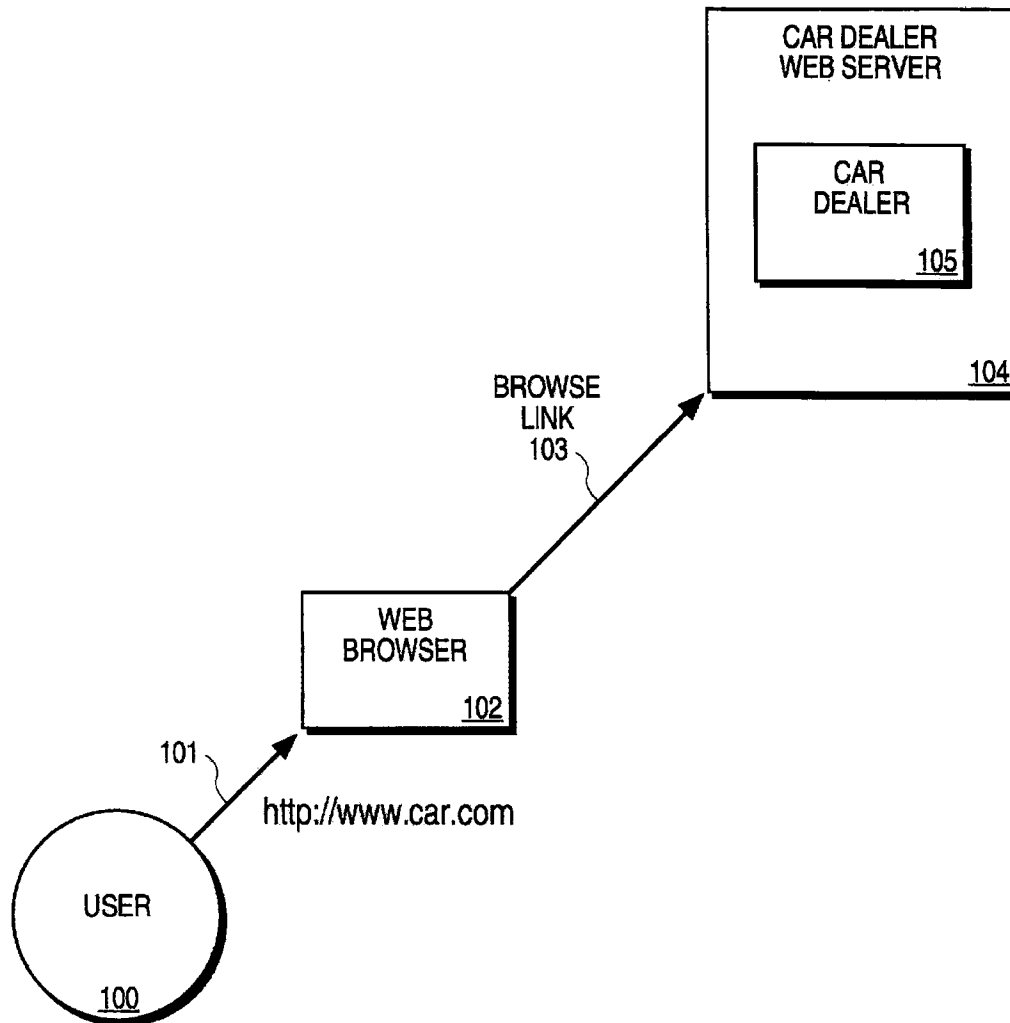
**Exhibit B**

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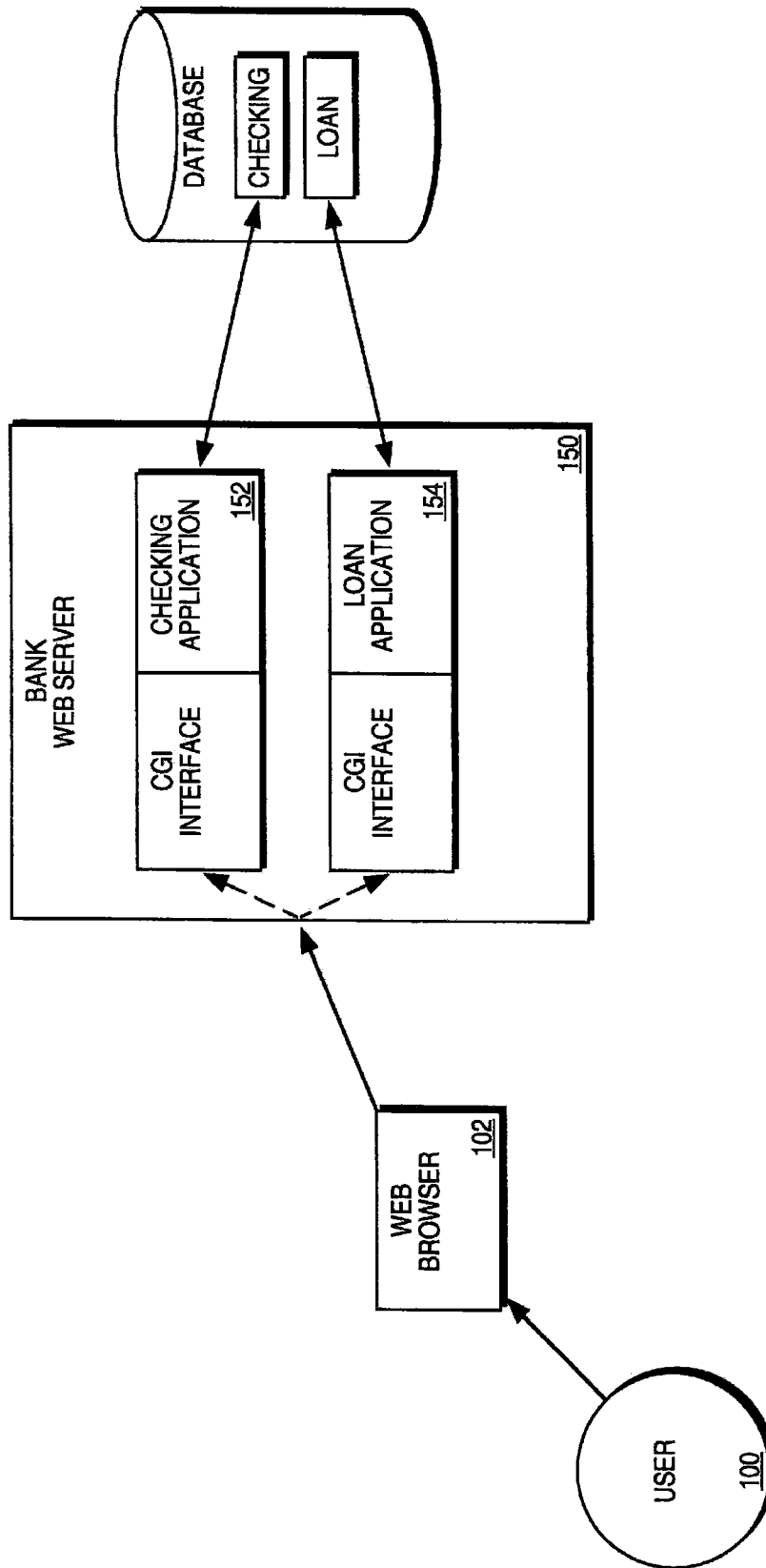
**FIG. 1A** (PRIOR ART)

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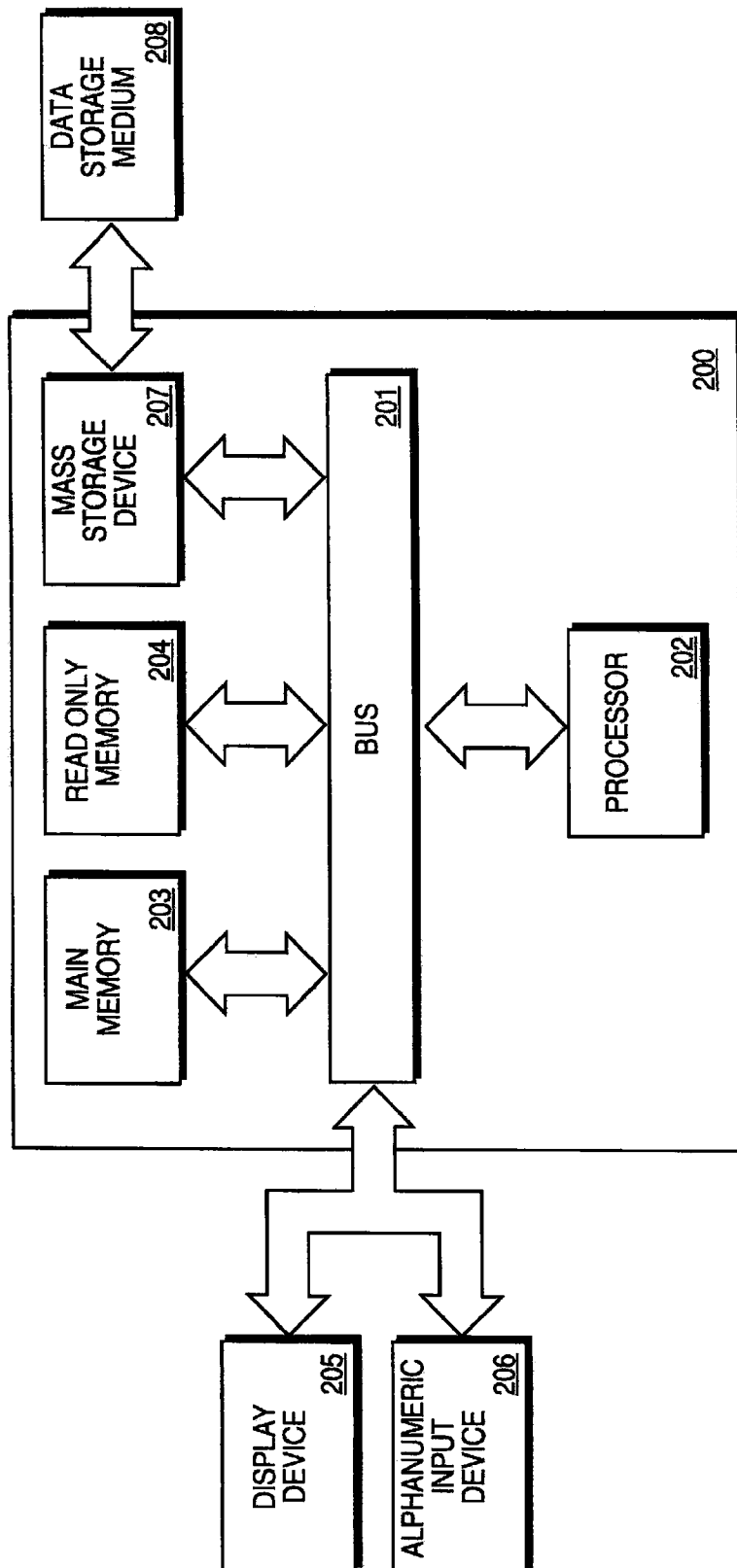
**FIG. 1B** (PRIOR ART)

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**FIG. 2**

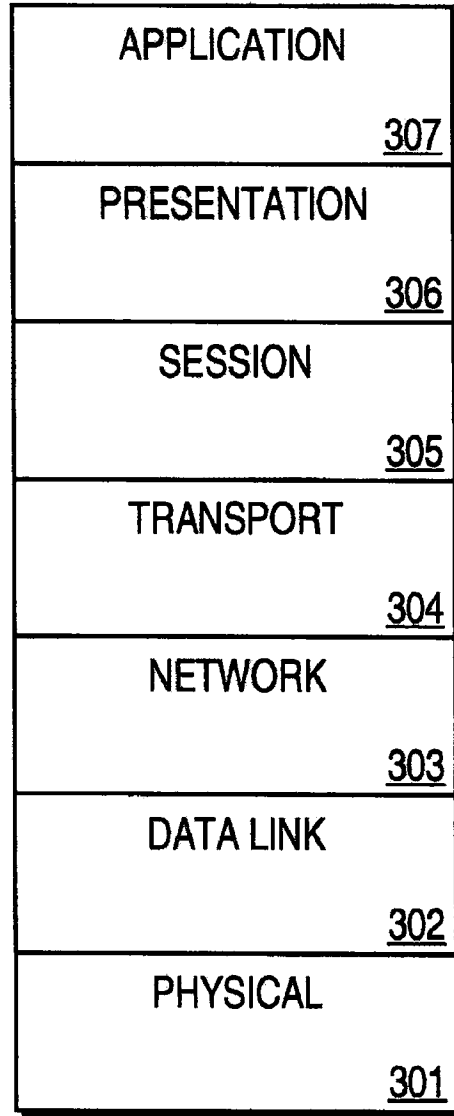

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OSI MODEL  
300



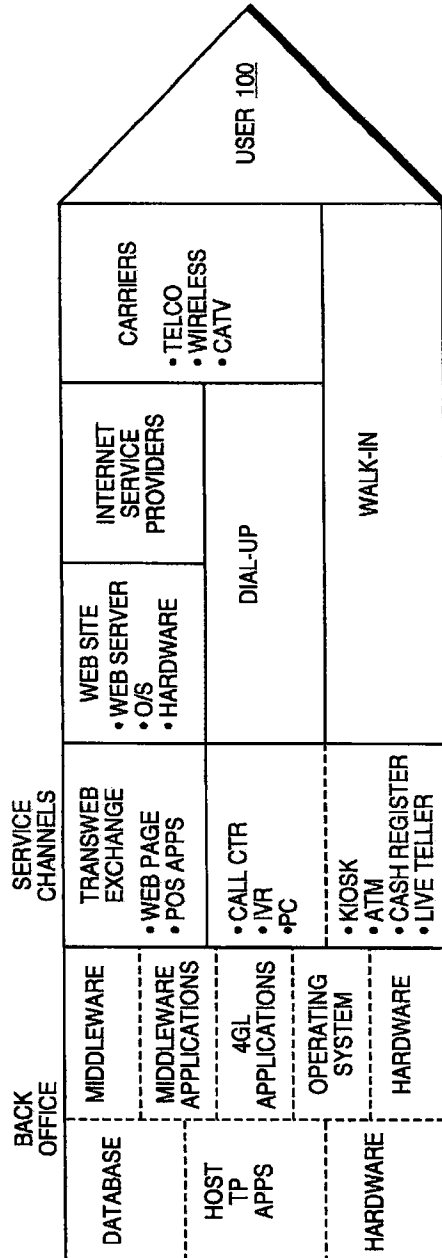
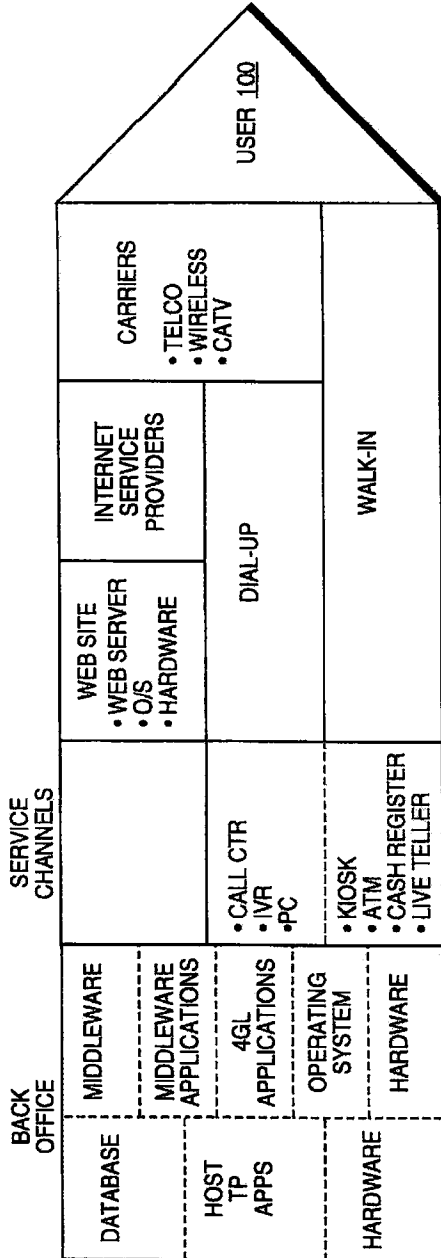
**FIG. 3**

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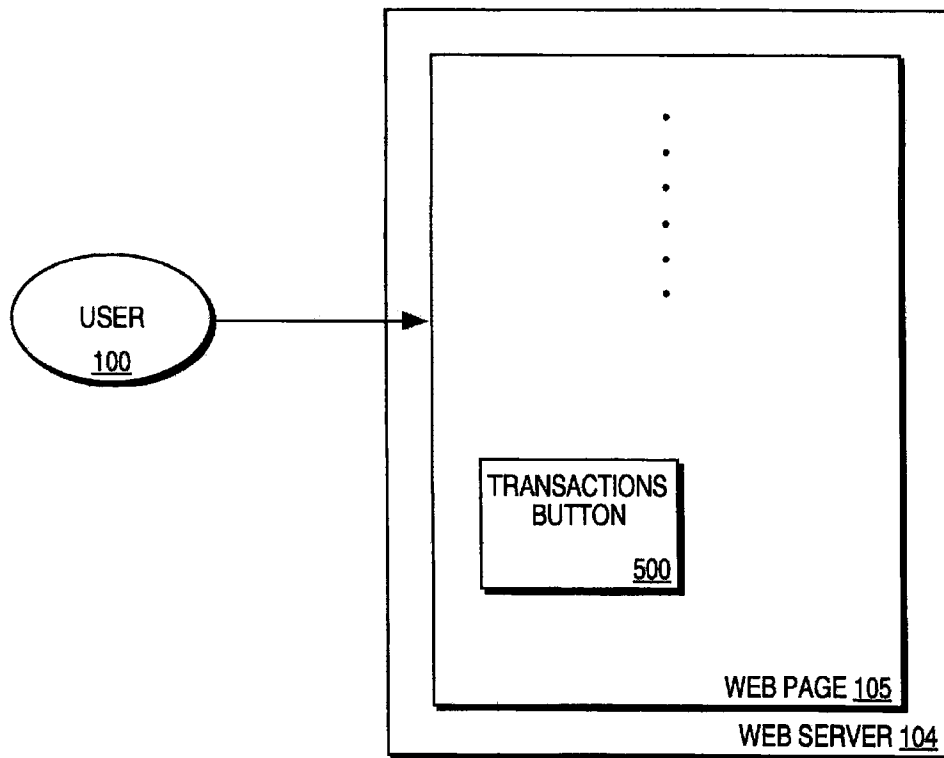


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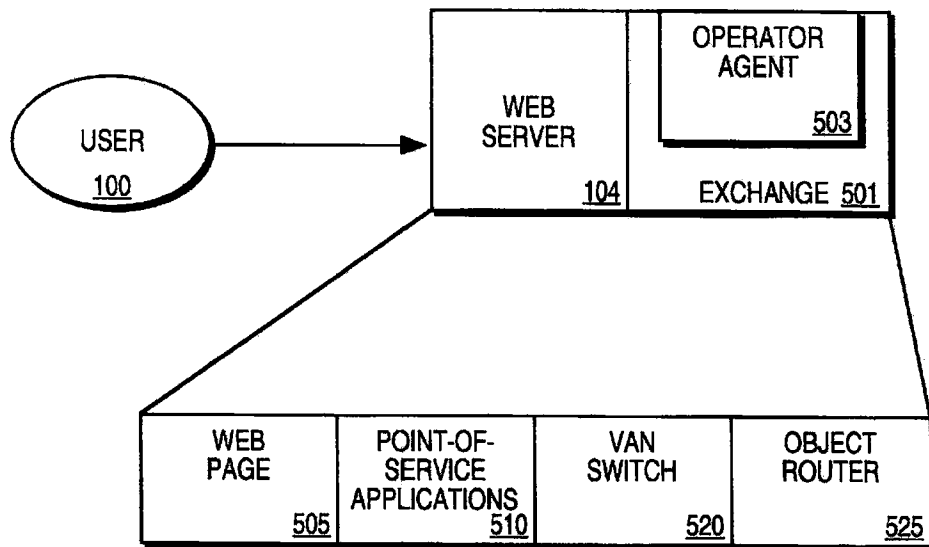
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**FIG. 5A**



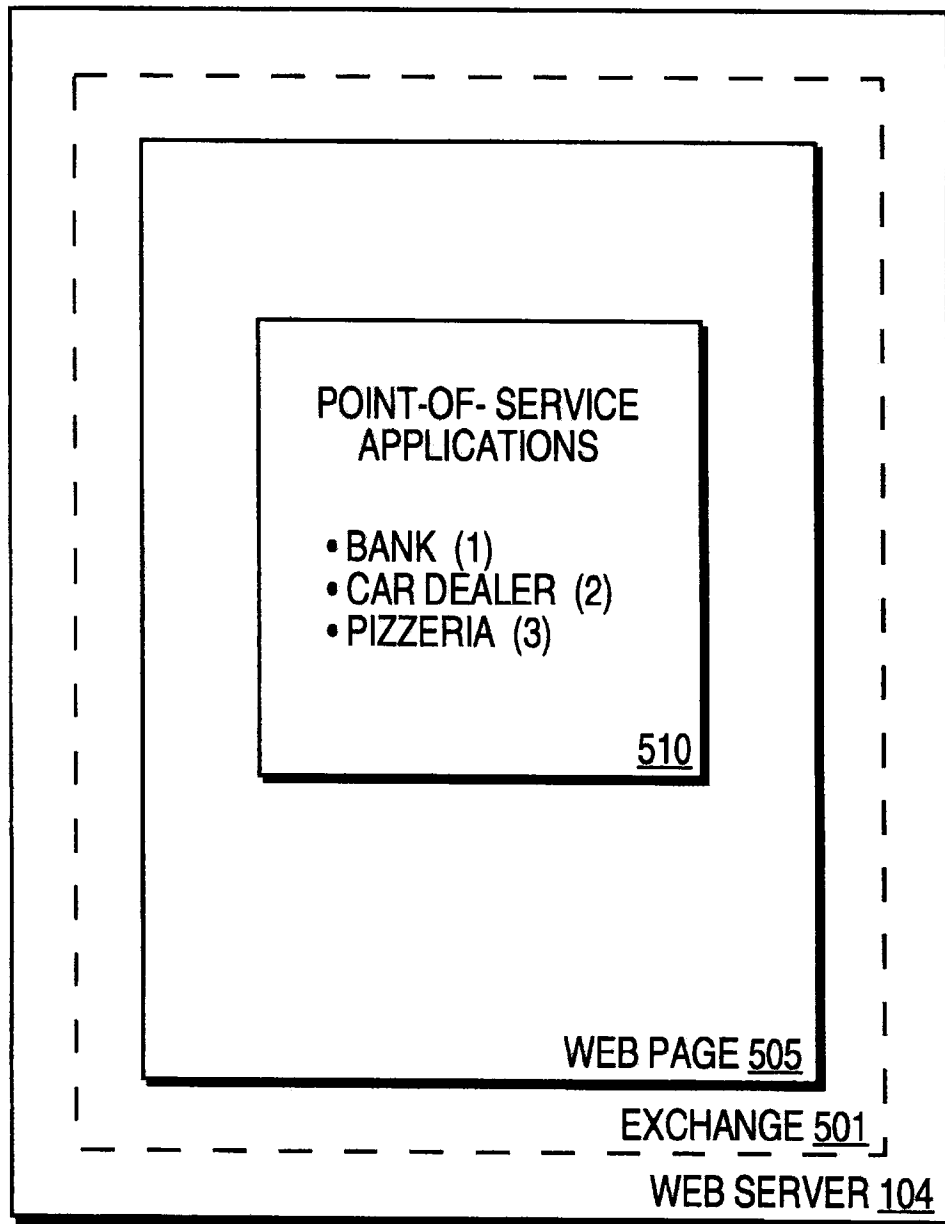
**FIG. 5B**

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**FIG. 5C**

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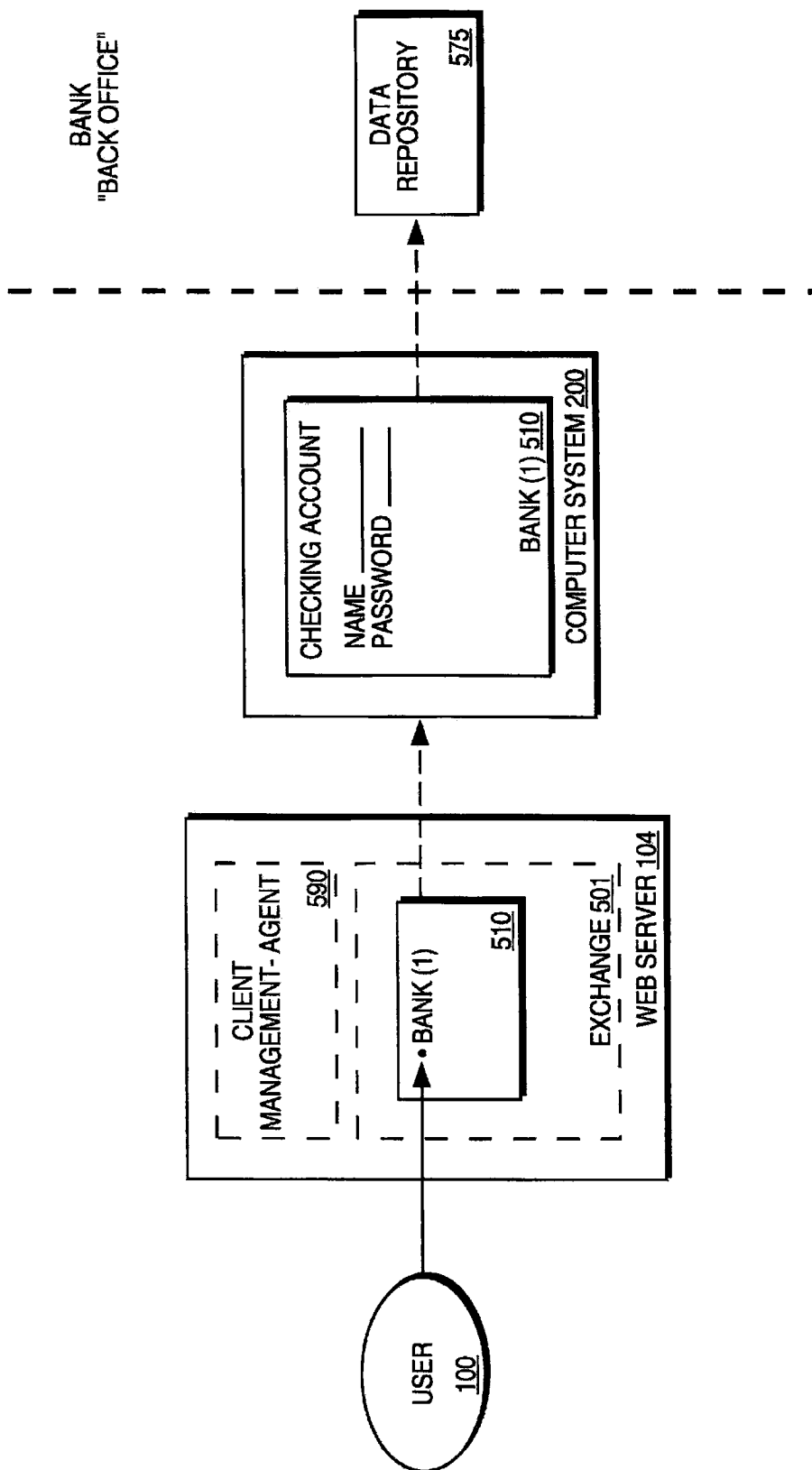


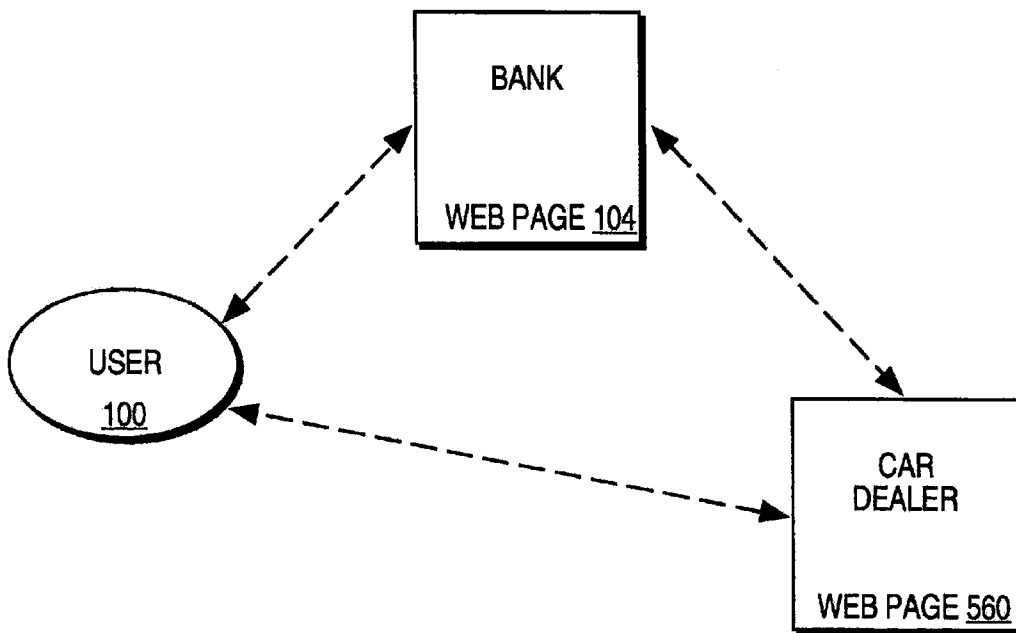
FIG. 5D

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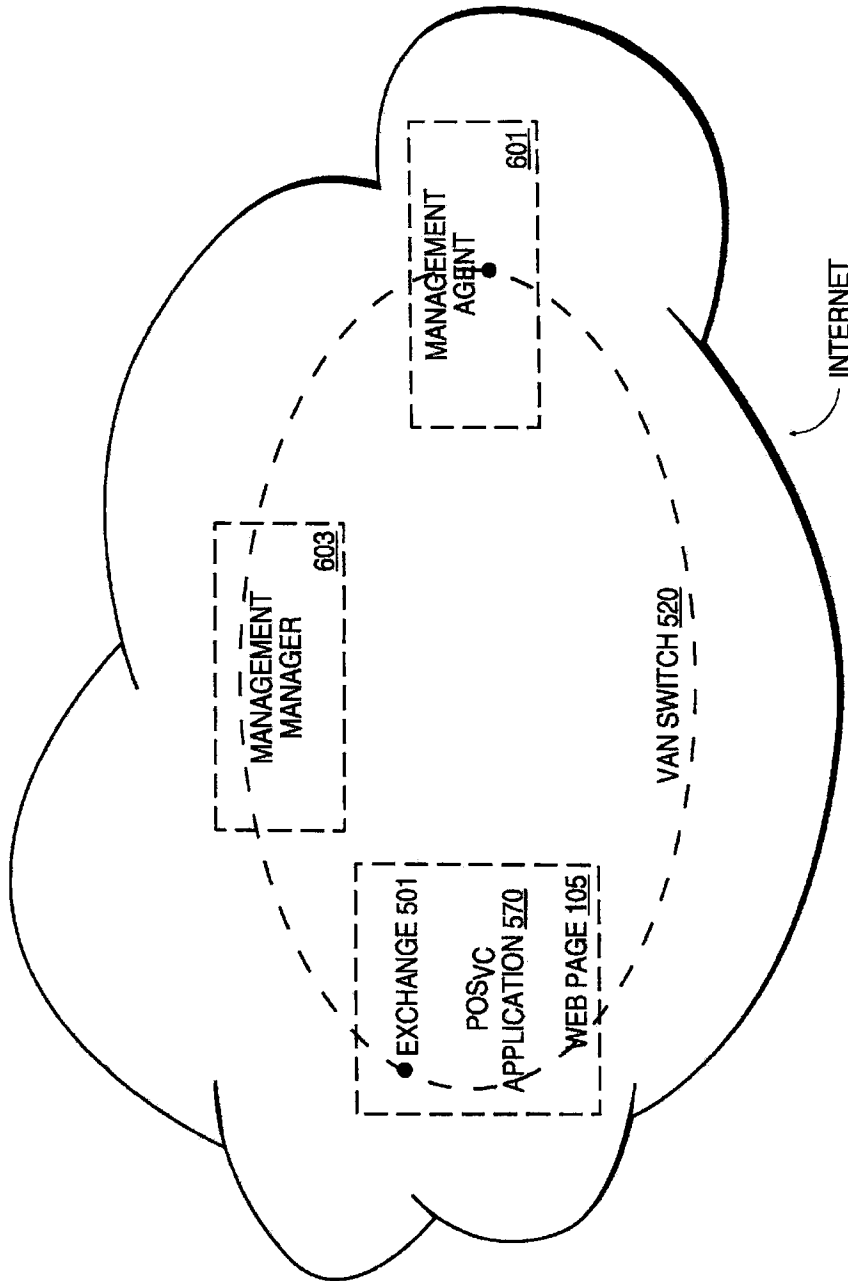
**FIG. 5E**

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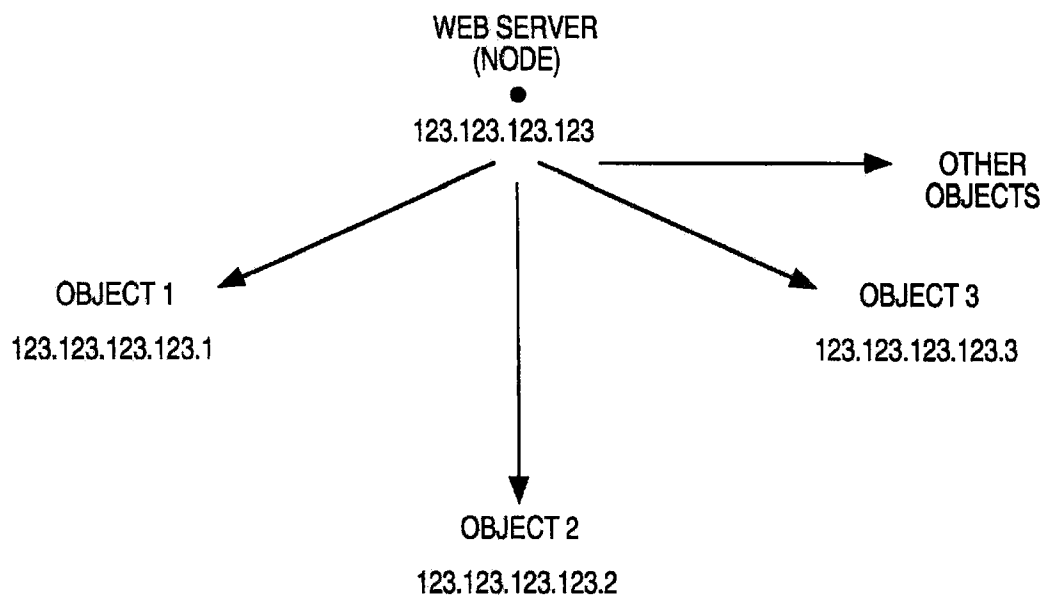
**FIG. 6A**

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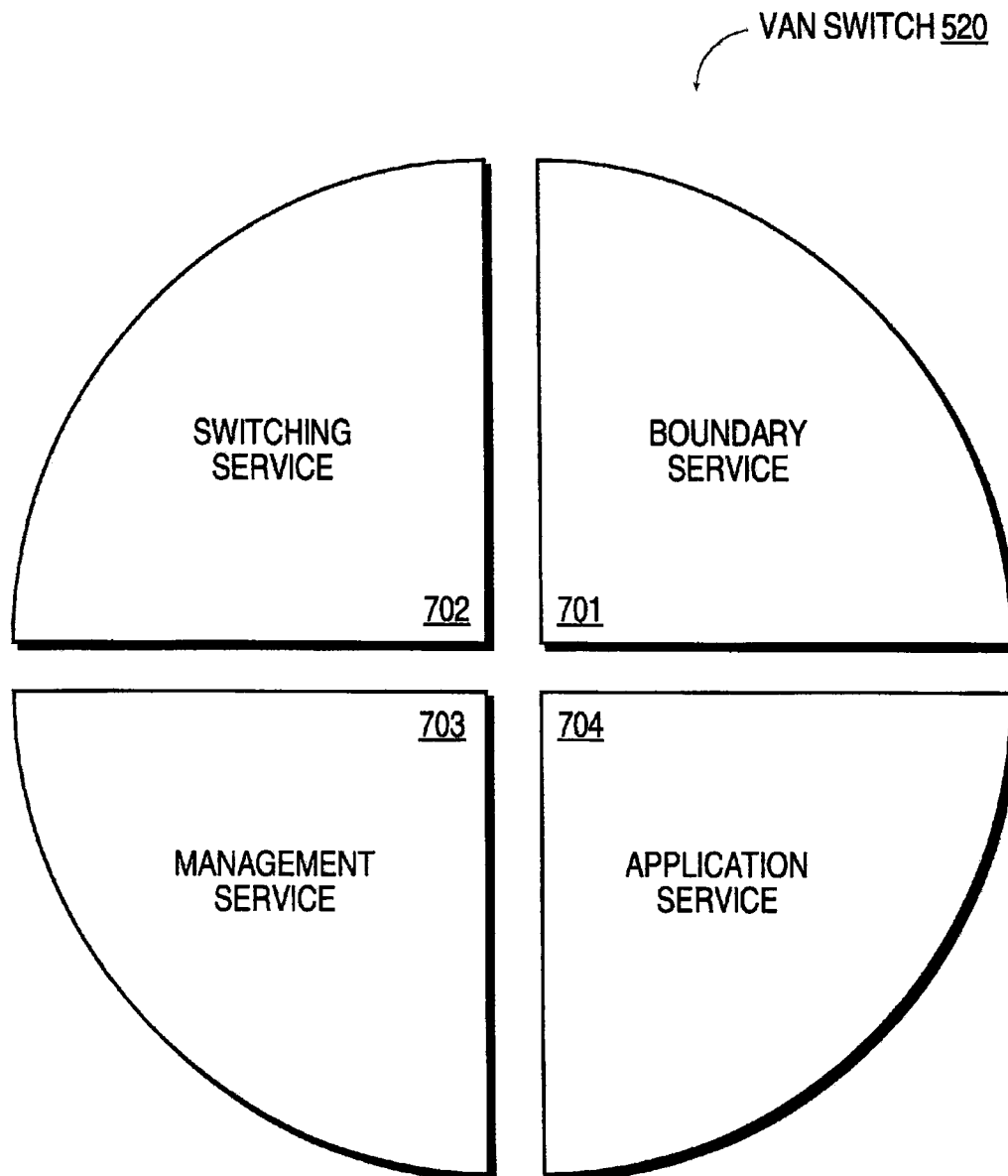
**FIG. 6B**

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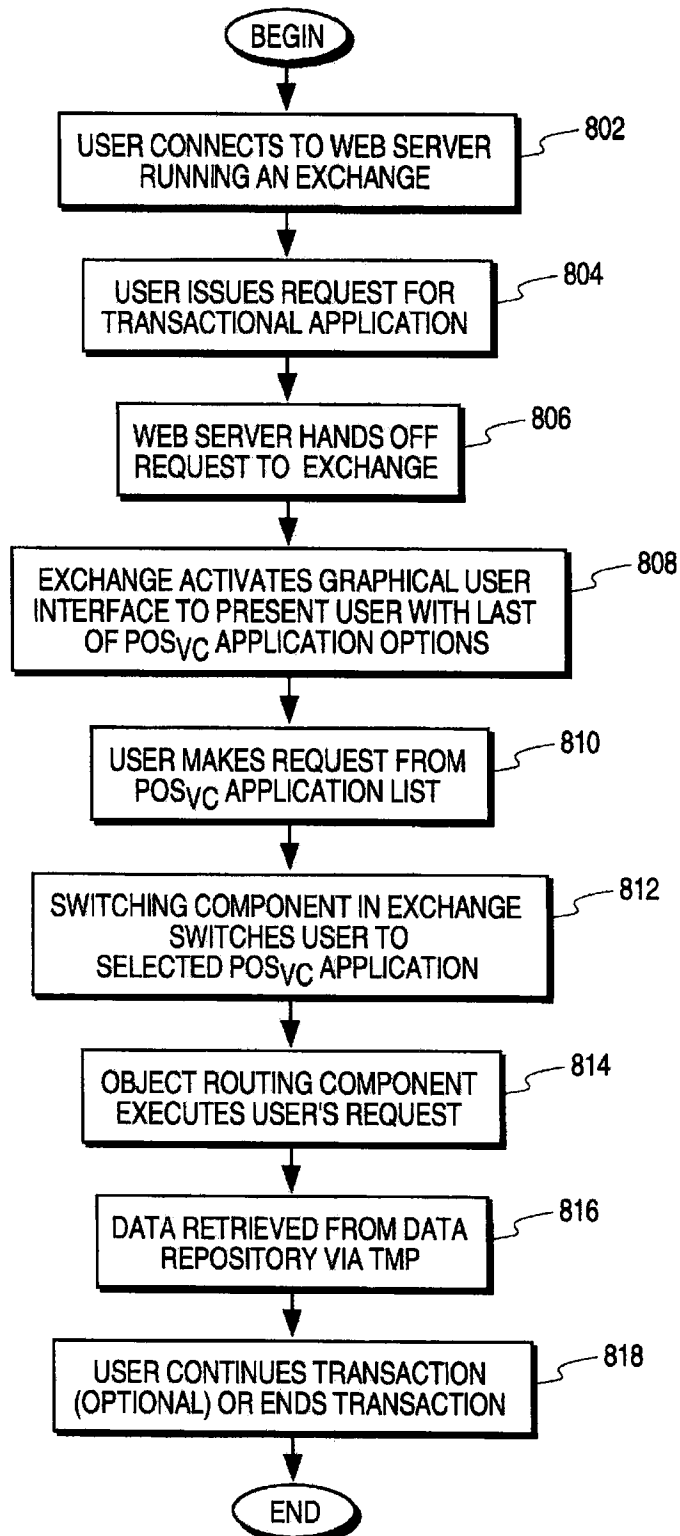
**FIG. 7**

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**FIG. 8**

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# VALUE-ADDED NETWORK SYSTEM FOR ENABLING REAL-TIME, BY-DIRECTIONAL TRANSACTIONS ON A NETWORK

## RELATED APPLICATIONS

This is a divisional of application Ser. No. 08/700,726, filed Aug. 5, 1996, now U.S. Pat. No. 5,778,178.

## FIELD OF THE INVENTION

The present invention relates to the area of Internet communications. Specifically, the present invention relates to a method and apparatus for configurable value-added network switching and object routing.

## BACKGROUND OF THE INVENTION

With the Internet and the World Wide Web ("the Web") evolving rapidly as a viable consumer medium for electronic commerce, new on-line services are emerging to fill the needs of on-line users. An Internet user today can browse on the Web via the use of a Web browser. Web browsers are software interfaces that run on Web clients to allow access to Web servers via a simple user interface. A Web user's capabilities today from a Web browser are, however, extremely limited. The user can perform one-way, browse-only interactions. Additionally, the user has limited "deferred" transactional capabilities, namely electronic mail (e-mail) capabilities. E-mail capabilities are referred to as "deferred transactions" because the consumer's request is not processed until the e-mail is received, read, and the person or system reading the e-mail executes the transaction. This transaction is thus not performed in real-time.

FIG. 1A illustrates typical user interactions on the Web today. User 100 sends out a request from Web browser 102 in the form of a universal resource locator (URL) 101 in the following manner: <http://www.car.com>. URL 101 is processed by Web browser 102 that determines the URL corresponds to car dealer Web page 105, on car dealer Web server 104. Web browser 102 then establishes browse link 103 to car dealer Web page 105. User 100 can browse Web page 105 and select "hot links" to jump to other locations in Web page 105, or to move to other Web pages on the Web. This interaction is typically a browse-only interaction. Under limited circumstances, the user may be able to fill out a form on car dealer Web page 105, and e-mail the form to car dealer Web server 104. This interaction is still strictly a one-way browse mode communications link, with the e-mail providing limited, deferred transactional capabilities.

Under limited circumstances, a user may have access to two-way services on the Web via Common Gateway Interface (CGI) applications. CGI is a standard interface for running external programs on a Web server. It allows Web servers to create documents dynamically when the server receives a request from the Web browser. When the Web server receives a request for a document, the Web server dynamically executes the appropriate CGI script and transmits the output of the execution back to the requesting Web browser. This interaction can thus be termed a "two-way" transaction. It is a severely limited transaction, however, because each CGI application is customized for a particular type of application or service.

For example, as illustrated in FIG. 1B, user 100 may access bank 150's Web server and attempt to perform transactions on checking account 152 and to make a payment on loan account 154. In order for user 100 to access checking account 152 and loan account 154 on the Web, CGI

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application scripts must be created for each account, as illustrated in FIG. 1B. The bank thus has to create individual scripts for each of its services to offer users access to these services. User 100 can then interact in a limited fashion with these individual applications. Creating and managing individual CGI scripts for each service is not a viable solution for merchants with a large number of services.

As the Web expands and electronic commerce becomes more desirable, the need increases for robust, real-time, bi-directional transactional capabilities on the Web. A true real-time, bi-directional transaction would allow a user to connect to a variety of services on the Web, and perform real-time transactions on those services. For example, although user 100 can browse car dealer Web page 105 today, the user cannot purchase the car, negotiate a car loan or perform other types of real-time, two-way transactions that he can perform with a live salesperson at the car dealership. Ideally, user 100 in FIG. 1A would be able to access car dealer Web page 105, select specific transactions that he desires to perform, such as purchase a car, and perform the purchase in real-time, with two-way interaction capabilities. CGI applications provide user 100 with a limited ability for two-way interaction with car dealer Web page 105, but due to the lack of interaction and management between the car dealer and the bank, he will not be able to obtain a loan and complete the purchase of the car via a CGI application. The ability to complete robust real-time, two-way transactions is thus not truly available on the Web today.

## SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a method and apparatus for providing real-time, two-way transactional capabilities on the Web. Specifically, one embodiment of the present invention discloses a configurable value-added network switch for enabling real-time transactions on the World Wide Web. The configurable value added network switch comprises means for switching to a transactional application in response to a user specification from a World Wide Web application, means for transmitting a transaction request from the transactional application, and means for processing the transaction request.

According to another aspect of the present invention, a method and apparatus for enabling object routing on the World Wide Web is disclosed. The method for enabling object routing comprises the steps of creating a virtual information store containing information entries and attributes, associating each of the information entries and the attributes with an object identity, and assigning a unique network address to each of the object identities.

Other objects, features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description.

## BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description of the present invention as set forth below.

FIG. 1A is an illustration of a current user's browse capabilities on the Web via a Web browser.

FIG. 1B is an illustration of a current user's capabilities to perform limited transactions on the Web via CGI applications.

FIG. 2 illustrates a typical computer system on which the present invention may be utilized.

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FIG. 3 illustrates the Open Systems Interconnection (OSI) Model.

FIG. 4A illustrates conceptually the user value chain as it exists today.

FIG. 4B illustrates one embodiment of the present invention.

FIG. 5A illustrates a user accessing a Web server including one embodiment of the present invention.

FIG. 5B illustrates the exchange component according to one embodiment of the present invention.

FIG. 5C illustrates an example of a point-of-service (POSvc) application list.

FIG. 5D illustrates a user selecting a bank POSvc application from the POSvc application list.

FIG. 5E illustrates a three-way transaction according to one embodiment of the present invention.

FIG. 6A illustrates a value-added network (VAN) switch.

FIG. 6B illustrates the hierarchical addressing tree structure of the networked objects in DOLSIBs.

FIG. 7 illustrates conceptually the layered architecture of a VAN switch.

FIG. 8 is a flow diagram illustrating one embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention relates to a method and apparatus for configurable value-added network switching and object routing and management. "Web browser" as used in the context of the present specification includes conventional Web browsers such as NCSA Mosaic™ from NCSA and Netscape Mosaic™ from Netscape™. The present invention is independent of the Web browser being utilized and the user can use any Web browser, without modifications to the Web browser. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent to one of ordinary skill in the art, however, that these specific details need not be used to practice the present invention. In other instances, well-known structures, interfaces and processes have not been shown in detail in order not to unnecessarily obscure the present invention.

FIG. 2 illustrates a typical computer system 200 in which the present invention operates. The preferred embodiment of the present invention is implemented on an IBM™ Personal Computer manufactured by IBM Corporation of Armonk, N.Y. Alternate embodiments may be implemented on a Macintosh™ computer manufactured by Apple™ Computer, Incorporated of Cupertino, Calif. It will be apparent to those of ordinary skill in the art that other alternative computer system architectures may also be employed.

In general, such computer systems as illustrated by FIG. 2 comprise a bus 201 for communicating information, a processor 202 coupled with the bus 201 for processing information, main memory 203 coupled with the bus 201 for storing information and instructions for the processor 202, a read-only memory 204 coupled with the bus 201 for storing static information and instructions for the processor 202, a display device 205 coupled with the bus 201 for displaying information for a computer user, an input device 206 coupled with the bus 201 for communicating information and command selections to the processor 202, and a mass storage device 207, such as a magnetic disk and associated disk drive, coupled with the bus 201 for storing information

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and instructions. A data storage medium 208 containing digital information is configured to operate with mass storage device 207 to allow processor 202 access to the digital information on data storage medium 208 via bus 201.

Processor 202 may be any of a wide variety of general purpose processors or microprocessors such as the Pentium™ microprocessor manufactured by Intel™ Corporation or the Motorola™ 68040 or Power PC™ brand microprocessor manufactured by Motorola™ Corporation. It will be apparent to those of ordinary skill in the art, however, that other varieties of processors may also be used in a particular computer system. Display device 205 may be a liquid crystal device, cathode ray tube (CRT), or other suitable display device. Mass storage device 207 may be a conventional hard disk drive, floppy disk drive, CD-ROM drive, or other magnetic or optical data storage device for reading and writing information stored on a hard disk, a floppy disk, a CD-ROM a magnetic tape, or other magnetic or optical data storage medium. Data storage medium 208 may be a hard disk, a floppy disk, a CD-ROM, a magnetic tape, or other magnetic or optical data storage medium.

In general, processor 202 retrieves processing instructions and data from a data storage medium 208 using mass storage device 207 and downloads this information into random access memory 203 for execution. Processor 202, then executes an instruction stream from random access memory 203 or read-only memory 204. Command selections and information input at input device 206 are used to direct the flow of instructions executed by processor 202. Equivalent input device 206 may also be a pointing device such as a conventional mouse or trackball device. The results of this processing execution are then displayed on display device 205.

The preferred embodiment of the present invention is implemented as a software module, which may be executed on a computer system such as computer system 200 in a conventional manner. Using well known techniques, the application software of the preferred embodiment is stored on data storage medium 208 and subsequently loaded into and executed within computer system 200. Once initiated, the software of the preferred embodiment operates in the manner described below.

FIG. 3 illustrates the Open Systems Interconnection (OSI) reference model. OSI Model 300 is an international standard that provides a common basis for the coordination of standards development, for the purpose of systems interconnection. The present invention is implemented to function as a routing switch within the "application layer" of the OSI model. The model defines seven layers, with each layer communicating with its peer layer in another node through the use of a protocol. Physical layer 301 is the lowest layer, with responsibility to transmit unstructured bits across a link. Data link layer 302 is the next layer above physical layer 301. Data link layer 302 transmits chunks across the link and deals with problems like checksumming to detect data corruption, orderly coordination of the use of shared media and addressing when multiple systems are reachable. Network bridges operate within data link layer 302.

Network layer 303 enables any pair of systems in the network to communicate with each other. Network layer 303 contains hardware units such as routers, that handle routing, packet fragmentation and reassembly of packets. Transport layer 304 establishes a reliable communication stream between a pair of systems, dealing with errors such as lost packets, duplicate packets, packet reordering and fragmen-

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tation. Session layer 305 offers services above the simple communication stream provided by transport layer 304. These services include dialog control and chaining. Presentation layer 306 provides a means by which OSI compliant applications can agree on representations for data. Finally, application layer 307 includes services such as file transfer, access and management services (FTAM), electronic mail and virtual terminal (VT) services. Application layer 307 provides a means for application programs to access the OSI environment. As described above, the present invention is implemented to function as a routing switch in application layer 307. Application layer routing creates an open channel for the management, and the selective flow of data from remote databases on a network.

#### A. Overview

FIG. 4A illustrates conceptually the user value chain as it exists today. The user value chain in FIG. 4A depicts the types of transactions that are performed today, and the channels through which the transactions are performed. A "transaction" for the purposes of the present invention includes any type of commercial or other type of interaction that a user may want to perform. Examples of transactions include a deposit into a bank account, a request for a loan from a bank, a purchase of a car from a car dealership or a purchase of a car with financing from a bank. A large variety of other transactions are also possible.

A typical user transaction today may involve user 100 walking into a bank or driving up to a teller machine, and interacting with a live bank teller, or automated teller machine (ATM) software applications. Alternatively, user 100 can perform the same transaction by using a personal computer (PC), activating application software on his PC to access his bank account, and dialing into the bank via a modem line. If user 100 is a Web user, however, there is no current mechanism for performing a robust, real-time transaction with the bank, as illustrated in FIG. 4A. CGI scripts provide only limited two-way capabilities, as described above. Thus, due to this lack of a robust mechanism by which real-time Web transactions can be performed, the bank is unable to be a true "Web merchant," namely a merchant capable of providing complete transactional services on the Web.

According to one embodiment of the present invention, as illustrated in FIG. 4B, each merchant that desires to be a Web merchant can provide real-time transactional capabilities to users who desire to access the merchants' services via the Web. This embodiment includes a service network running on top of a facilities network, namely the Internet, the Web or e-mail networks. For the purposes of this application, users are described as utilizing PC's to access the Web via Web server "switching" sites. (Switching is described in more detail below). Users may also utilize other personal devices such as network computers or cellular devices to access the merchants' services via appropriate switching sites. These switching sites include non-Web network computer sites and cellular provider sites. Five components interact to provide this service network functionality, namely an exchange, an operator agent, a management agent, a management manager and a graphical user interface. All five components are described in more detail below.

As illustrated in FIG. 5A, user 100 accesses Web server 104. Having accessed Web server 104, user 100 can decide that he desires to perform real-time transactions. When Web server 104 receives user 100's indication that he desires to perform real-time transactions, the request is handed over to an exchange component. Thus, from Web page 105, for

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example, user 100 can select button 500, entitled "Transactions" and Web server 104 hands user 100's request over to the exchange component. The button and the title can be replaced by any mechanism that can instruct a Web server to hand over the consumer's request to the exchange component.

FIG. 5B illustrates exchange 501. Exchange 501 comprises Web page 505 and point-of-service (POSvc) applications 510. Exchange 501 also conceptually includes a switching component and an object routing component (described in more detail below). POSvc applications 510 are transactional applications, namely applications that are designed to incorporate and take advantage of the capabilities provided by the present invention. Although exchange 501 is depicted as residing on Web server 104, the exchange can also reside on a separate computer system that resides on the Internet and has an Internet address. Exchange 501 may also include operator agent 503 that interacts with a management manager (described in more detail below). Exchange 501 creates and allows for the management (or distributed control) of a service network, operating within the boundaries of an IP-based facilities network. Thus, exchange 501 and a management agent component, described in more detail below, under the headings "VAN Switch and Object Routing," together perform the switching, object routing, application and service management functions according to one embodiment of the present invention.

Exchange 501 processes the consumer's request and displays an exchange Web page 505 that includes a list of POSvc applications 510 accessible by exchange 501. A POSvc application is an application that can execute the type of transaction that the user may be interested in performing. The POSvc list is displayed via the graphical user interface component. One embodiment of the present invention supports HyperText Markup Language as the graphical user interface component. Virtual Reality Markup Language and Java™ are also supported by this embodiment. A variety of other graphical user interface standards can also be utilized to implement the graphical user interface.

An example of a POSvc application list is illustrated in FIG. 5C. User 100 can thus select from POSvc applications Bank 510(1), Car Dealer 510(2) or Pizzeria 510(3). Numerous other POSvc applications can also be included in this selection. If user 100 desires to perform a number of banking transactions, and selects the Bank application, a Bank POSvc application will be activated and presented to user 100, as illustrated in FIG. 5D. For the purposes of illustration, exchange 501 in FIG. 5D is shown as running on a different computer system (Web server 104) from the computer systems of the Web merchants running POSvc applications (computer system 200). Exchange 501 may, however, also be on the same computer system as one or more of the computer systems of the Web merchants.

Once Bank POSvc application 510 has been activated, user 100 will be able to connect to Bank services and utilize the application to perform banking transactions, thus accessing data from a host or data repository 575 in the Bank "Back Office." The Bank Back Office comprises legacy databases and other data repositories that are utilized by the Bank to store its data. This connection between user 100 and Bank services is managed by exchange 501. As illustrated in FIG. 5D, once the connection is made between Bank POSvc application 510(1), for example, and Bank services, an operator agent on Web server 104 may be activated to ensure the availability of distributed functions and capabilities.

Each Web merchant may choose the types of services that it would like to offer its clients. In this example, if Bank

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decided to include in their POSvc application access to checking and savings accounts, user 100 will be able to perform real-time transactions against his checking and savings accounts. Thus, if user 100 moves \$500 from his checking account into his savings account, the transaction will be performed in real-time, in the same manner the transaction would have been performed by a live teller at the bank or an ATM machine. Therefore, unlike his prior access to his account, user 100 now has the capability to do more than browse his bank account. The ability to perform these types of robust, real-time transactions from a Web client is a significant aspect of the present invention.

Bank can also decide to provide other types of services in POSvc application 510(1). For example, Bank may agree with Car dealership to allow Bank customers to purchase a car from that dealer, request a car loan from Bank, and have the entire transaction performed on the Web, as illustrated in FIG. 5E. In this instance, the transactions are not merely two-way, between the user and Bank, but three-way, amongst the consumer, Bank and Car dealership. According to one aspect of the present invention, this three-way transaction can be expanded to n-way transactions, where n represents a predetermined number of merchants or other service providers who have agreed to cooperate to provide services to users. The present invention therefore allows for "any-to-any" communication and transactions on the Web, thus facilitating a large, flexible variety of robust, real-time transactions on the Web.

Finally, Bank may also decide to provide intra-merchant or intra-bank services, together with the inter-merchant services described above. For example, if Bank creates a POSvc application for use by the Bank Payroll department, Bank may provide its own employees with a means for submitting timecards for payroll processing by the Bank's Human Resources (HR) Department. An employee selects the Bank HR POSvc application, and submits his timecard. The employee's timecard is processed by accessing the employee's payroll information, stored in the Bank's Back Office. The transaction is thus processed in real-time, and the employee receives his paycheck immediately.

#### B. Van Switching and Object Routing

As described above, exchange 501 and management agent 601, illustrated in FIG. 6A, together constitute a value-added network (VAN) switch. These two elements may take on different roles as necessary, including peer-to-peer, client-server or master-slave roles. Management manager 603 is illustrated as residing on a separate computer system on the Internet. Management manager 603 can, however, also reside on the same machine as exchange 501. Management manager 603 interacts with the operator agent 503 residing on exchange 501.

VAN switch 520 provides multi-protocol object routing, depending upon the specific VAN services chosen. This multi-protocol object routing is provided via a proprietary protocol, TransWeb™ Management Protocol (TMP). TMP incorporates the same security features as the traditional Simple Network Management Protocol, SNMP. It also allows for the integration of other traditional security mechanisms, including RSA security mechanisms.

One embodiment of the present invention utilizes TMP and distributed on-line service information bases (DOLSIBs) to perform object routing. Alternatively, TMP can incorporate s-HTTP, Java™, the WinSock API or ORB with DOLSIBs to perform object routing. DOLSIBs are virtual information stores optimized for networking. All information entries and attributes in a DOLSIB virtual information store are associated with a networked object

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identity. The networked object identity identifies the information entries and attributes in the DOLSIB as individual networked objects, and each networked object is assigned an Internet address. The Internet address is assigned based on the IP address of the node at which the networked object resides.

For example, in FIG. 5A, Web server 104 is a node on the Internet, with an IP address. All networked object associated with Web server 104 will therefore be assigned an Internet address based on the Web server 104's IP address. These networked objects thus "branch" from the node, creating a hierarchical tree structure. The Internet address for each networked object in the tree essentially establishes the individual object as an "IP-reachable" or accessible node on the Internet. TMP utilizes this Internet address to uniquely identify and access the object from the DOLSIB. FIG. 6B illustrates an example of this hierarchical addressing tree structure.

Each object in the DOLSIB has a name, a syntax and an encoding. The name is an administratively assigned object ID specifying an object type. The object type together with the object instance serves to uniquely identify a specific instantiation of the object. For example, if object 610 is information about models of cars, then one instance of that object would provide user 100 with information about a specific model of the car while another instance would provide information about a different model of the car. The syntax of an object type defines the abstract data structure corresponding to that object type. Encoding of objects defines how the object is represented by the object type syntax while being transmitted over the network.

#### C. Management and Administration

As described above, exchange 501 and management agent 601 together constitute a VAN switch. FIG. 7 illustrates conceptually the layered architecture of VAN switch 520. Specifically, boundary service 701 provides the interfaces between VAN switch 520, the Internet and the Web, and multi-media end user devices such as PCs, televisions or telephones. Boundary service 701 also provides the interface to the on-line service provider. A user can connect to a local application, namely one accessible via a local VAN switch, or be routed or "switched" to an application accessible via a remote VAN switch.

Switching service 702 is an OSI application layer switch. Switching service 702 thus represents the core of the VAN switch. It performs a number of tasks including the routing of user connections to remote VAN switches, described in the paragraph above, multiplexing and prioritization of requests, and flow control. Switching service 702 also facilitates open systems' connectivity with both the Internet (a public switched network) and private networks including back office networks, such as banking networks. Interconnected application layer switches form the application network backbone. These switches are one significant aspect of the present invention.

Management service 703 contains tools such as Information Management Services (IMS) and application Network Management Services (NMS). These tools are used by the end users to manage network resources, including VAN switches. Management service 703 also provides applications that perform Operations, Administration, Maintenance & Provisioning (OAM&P) functions. These OAM&P functions include security management, fault management, configuration management, performance management and billing management. Providing OAM&P functions for applications in this manner is another significant aspect of the present invention.

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Finally, application service 704 contains application programs that deliver customer services. Application service 704 includes POSvc applications such as Bank POSvc described above, and illustrated in FIG. 6A. Other examples of VAN services include multi-media messaging, archival/ retrieval management, directory services, data staging, conferencing, financial services, home banking, risk management and a variety of other vertical services. Each VAN service is designed to meet a particular set of requirements related to performance, reliability, maintenance and ability to handle expected traffic volume. Depending on the type of service, the characteristics of the network elements will differ. VAN service 704 provides a number of functions including communications services for both management and end users of the network and control for the user over the user's environment.

FIG. 8 is a flow diagram illustrating one embodiment of the present invention. A user connects to a Web server running an exchange component in step 802. In step 804, the user issues a request for a transactional application, and the web server hands off the request to an exchange in step 806. The exchange activates a graphical user interface to present user with a list of POSvc application options in step 808. In step 810, the user makes a selection from the POSvc application list. In step 812, the switching component in the exchange switches the user to the selected POSvc application, and in step 814, the object routing component executes the user's request. Data is retrieved from the appropriate data repository via TMP in step 816, and finally, the user may optionally continue the transaction in step 818 or end the transaction.

Thus, a configurable value-added network switching and object routing method and apparatus is disclosed. These specific arrangements and methods described herein are merely illustrative of the principles of the present invention. Numerous modifications in form and detail may be made by those of ordinary skill in the art without departing from the scope of the present invention. Although this invention has been shown in relation to a particular preferred embodiment, it should not be considered so limited. Rather, the present invention is limited only by the scope of the appended claims.

We claim:

1. A configurable value-added network switch for enabling real-time transactions on a network, said configurable value-added network switch comprising:

means for switching to a transactional application in response to a user specification from a network application, said transactional application providing a user with a plurality of transactional services managed by at least one value-added network service provider, said value-added network service provider keeping a transaction flow captive, said plurality of transactional services being performed interactively and in real time; means for transmitting a transaction request from said transactional application; and means for processing said transaction request.

2. The configurable value-added network switch as claimed in claim 1 wherein said means for switching to a transactional application further comprises:

means for receiving said user specification; means for enabling a switch to said transactional application; and means for activating said transactional application.

3. The configurable value-added network switch as claimed in claim 2 wherein said means for activating said

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transactional application further includes means for creating a transaction link between said network application and said transactional application.

4. The configurable value-added network switch as claimed in claim 2 wherein said means for receiving said user specification further comprises:

means for presenting said user with a list of transactional applications, each of said transactional application being associated with a particular value-added network service provider; and

means for submitting said user specification according to a user's selection of said transactional application from said list of transactional applications.

5. The configurable value-added network switch as claimed in claim 1 wherein said means for processing said transaction request further comprises means for coupling said means for transmitting to a host means.

6. The configurable value-added network switch as claimed in claim 5 wherein said host means contains data corresponding to said transaction request.

7. The configurable value-added network switch as claimed in claim 1 wherein said value-added network service providers cooperating to provide said plurality of transactional services to users.

8. The configurable value-added network switch as claimed in claim 1 further comprising means for controlling and prioritizing multiple transaction requests initiated by various users.

9. The configurable value-added network switch as claimed in claim 1 further comprising means for providing security management, fault management, configuration management, performance management and billing management.

10. A method for configuring a value-added network switch for enabling real-time transactions on a network, said method for configuring said value-added network switch comprising the steps of:

switching to a transactional application in response to a user specification from a network application, said transactional application providing a user with a plurality of transactional services managed by at least one value-added network service provider, said value-added network service provider keeping a transaction flow captive, said plurality of transactional services being performed interactively and in real time;

transmitting a transaction request from said transactional application; and processing said transaction request.

11. The method for configuring said value-added network switch as claimed in claim 10 wherein said step of switching to a transactional application further comprises the steps of:

receiving said user specification; enabling a switch to said transactional application; and activating said transactional application.

12. The method for configuring said value-added network switch as claimed in claim 11 wherein said step of activating said transactional application further includes a step of creating a transaction link between said network application and said transactional application.

13. The method for configuring said value-added network switch as claimed in claim 11 further comprising the steps of:

controlling security; performing fault management; providing configuration management; managing performance; and

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enabling billing management.

14. The method for configuring said value-added network switch as claimed in claim 11 wherein said step of receiving said user specification further comprises steps of:

presenting said user with a list of transactional applications, each of said transactional application being associated with a particular Internet service provider; and

submitting said user specification according to a user's selection of said transactional application from said list of transactional applications.

15. The method for configuring said value-added network switch as claimed in claim 10 wherein said step of processing said transaction request further comprises the step of transmitting said transaction request to a host means.

16. The method for configuring said value-added network switch as claimed in claim 15 wherein said host means contains data corresponding to said transaction request.

17. The method for configuring said value-added network switch as claimed in claim 10 wherein said value-added network service providers cooperate to provide said plurality of transactional services to said user.

18. The method for configuring said value-added network switch as claimed in claim 10 further comprising the step of controlling and prioritizing multiple transaction requests initiated by various users.

19. A method for enabling object routing on a network, said method for enabling object routing comprising the steps of:

associating an object identity with information entries and attributes, wherein the object identity represents a networked object;

storing said information entries and said attributes in a virtual information store; and

assigning a unique network address to said object identity.

20. The method in claim 19 wherein said step of associating said object identity with said information entries and said attributes in said virtual information store further includes the step of associating a name, a syntax and an encoding for said object identity.

21. The method in claim 20 wherein said name associated with said object identity specifies an object type.

22. The method in claim 21 wherein said object type and an object instance uniquely identify an instantiation of said object type.

23. The method in claim 22 wherein said syntax defines a data structure for said object type.

24. The method in claim 19 further comprising the step of utilizing said unique network address to identify and route said object identity on the network.

25. The method in claim 19 further comprising the step of utilizing said unique network address to identify and route said object identity on the Internet.

26. The method in claim 19 further comprising the step of utilizing said unique network address of said object identity

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to perform Operations, Administration, Maintenance & Provisioning (OAM&P) functions.

27. An object router on a network, said object router comprising:

means for associating an object identity with information entries and attributes, wherein the object identity represents a networked object;

means for storing said information entries and said attributes in a virtual information store; and

means for assigning a unique network address to said object identity.

28. The object router in claim 27 wherein said means for associating said object identity with said information entries and said attributes in said virtual information store further includes means for associating a name, a syntax and an encoding for said object identity.

29. The object router in claim 28 wherein said name of said object identity specifies an object type.

30. The object router in claim 29 wherein said object type and an object instance uniquely identify an instantiation of said object type.

31. The object router in claim 30 wherein said syntax defines a data structure for said object type.

32. The object router in claim 27 further comprising means for utilizing said unique network address to identify and route said object identity on the network.

33. The object router in claim 27 further comprising means for utilizing said unique network address to identify and route said object identity on the Internet.

34. The object router in claim 27 further comprising the step of utilizing said unique network address of said object identity to perform Operations, Administration, Maintenance & Provisioning (OAM&P) functions.

35. A configurable value-added network system for enabling real-time transactions on a network, said configurable value-added network system comprising:

means for switching to a transactional application in response to a user specification from a network application, said transactional application providing a user with a plurality of transactional services managed by at least one value-added network service provider, said value-added network service provider keeping a transaction flow captive, said plurality of transactional services being performed interactively and in real time;

means for activating an agent to create a transaction link between said user application and said transactional application;

means for transmitting a transaction request from said transactional application; and

a host means for processing said transaction request and retrieving data corresponding to said transaction request.

\* \* \* \* \*



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**Arunachalam**

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(45) **Date of Patent:** **Oct. 11, 2011**

(54) **MULTIMEDIA TRANSACTIONAL SERVICES**

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(60) Continuation-in-part of application No. 09/792,323, filed on Feb. 23, 2001, now Pat. No. 7,340,506, which is a continuation-in-part of application No. 08/879,958, filed on Jun. 20, 1997, now Pat. No. 5,987,500, which is a division of application No. 08/700,726, filed on Aug. 5, 1996, now Pat. No. 5,778,178.

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(51) Int. Cl. **G06F 13/00** (2006.01)

(52) U.S. Cl. .... **709/219; 709/225; 709/229**

(58) Field of Classification Search .... **709/217, 709/219, 223, 225, 227, 229, 250; 719/328, 719/329**

See application file for complete search history.

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Primary Examiner — Viet Vu

(57) **ABSTRACT**

The present invention provides a method and apparatus for providing real-time, two-way transactional capabilities on the Web. Specifically, one embodiment of the present invention discloses a method for enabling object routing, the method comprising the steps of creating a virtual information store containing information entries and attributes associating each of the information entries and the attributes with an object identity, and assigning a unique network address to each of the object identities. A method is also disclosed for enabling service management of the value-added network service, to perform OAM&P functions on the services network.

**11 Claims, 13 Drawing Sheets**

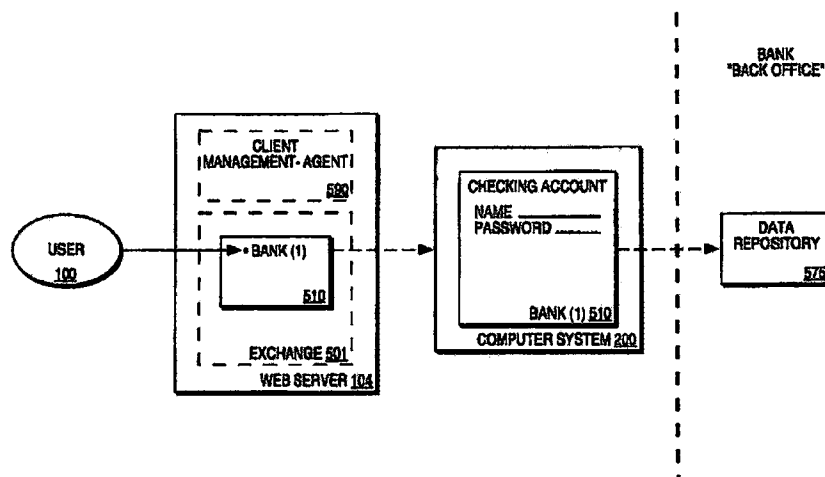


Exhibit C

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"Declaration of Eric 3. Stieglitz in Support Of plaintiff WebXchange Inc.'s Answering Brief in Opposition to Defendants' Motion to Bifurcate, and for Early Trial on, the Issue of Inequitable Conduct // Redacted—Public Version / signed Apr. 27, 2009 Certificate of Service I, the undersigned, hereby certify that on May 13, 2009, I electronically filed the foregoing with the Clerk of the Court using CM/ECF, which will send notification of such filing(s) to the following: (Two Parts)" Julia Heaney.

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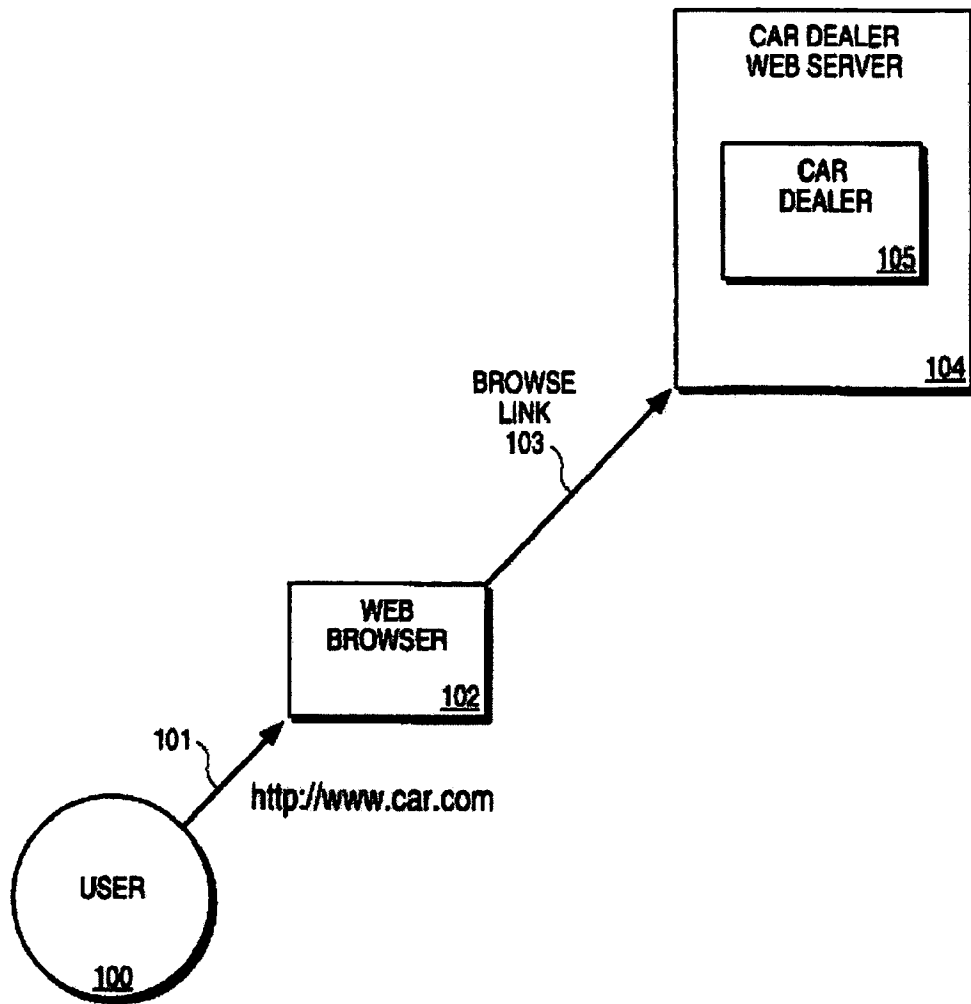
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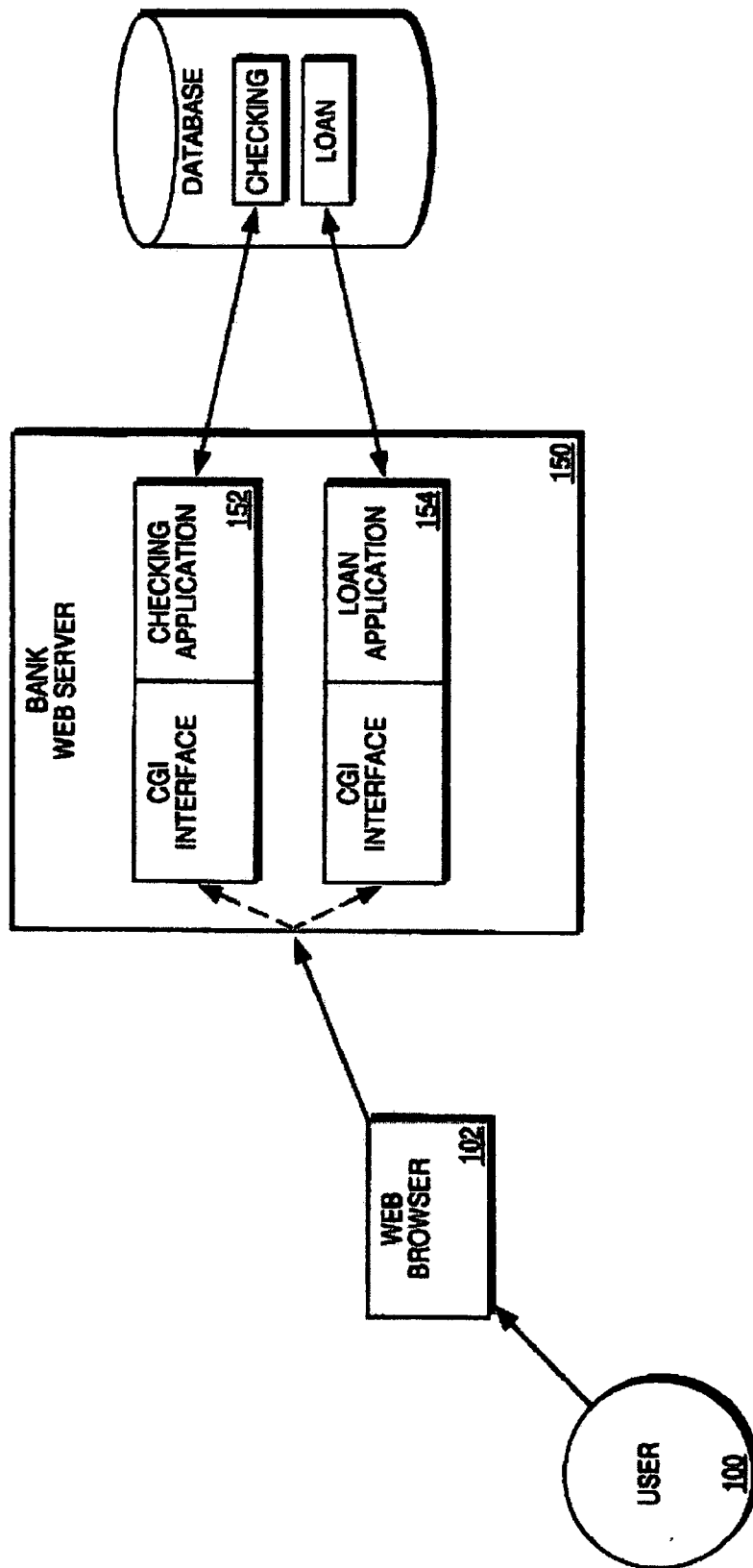
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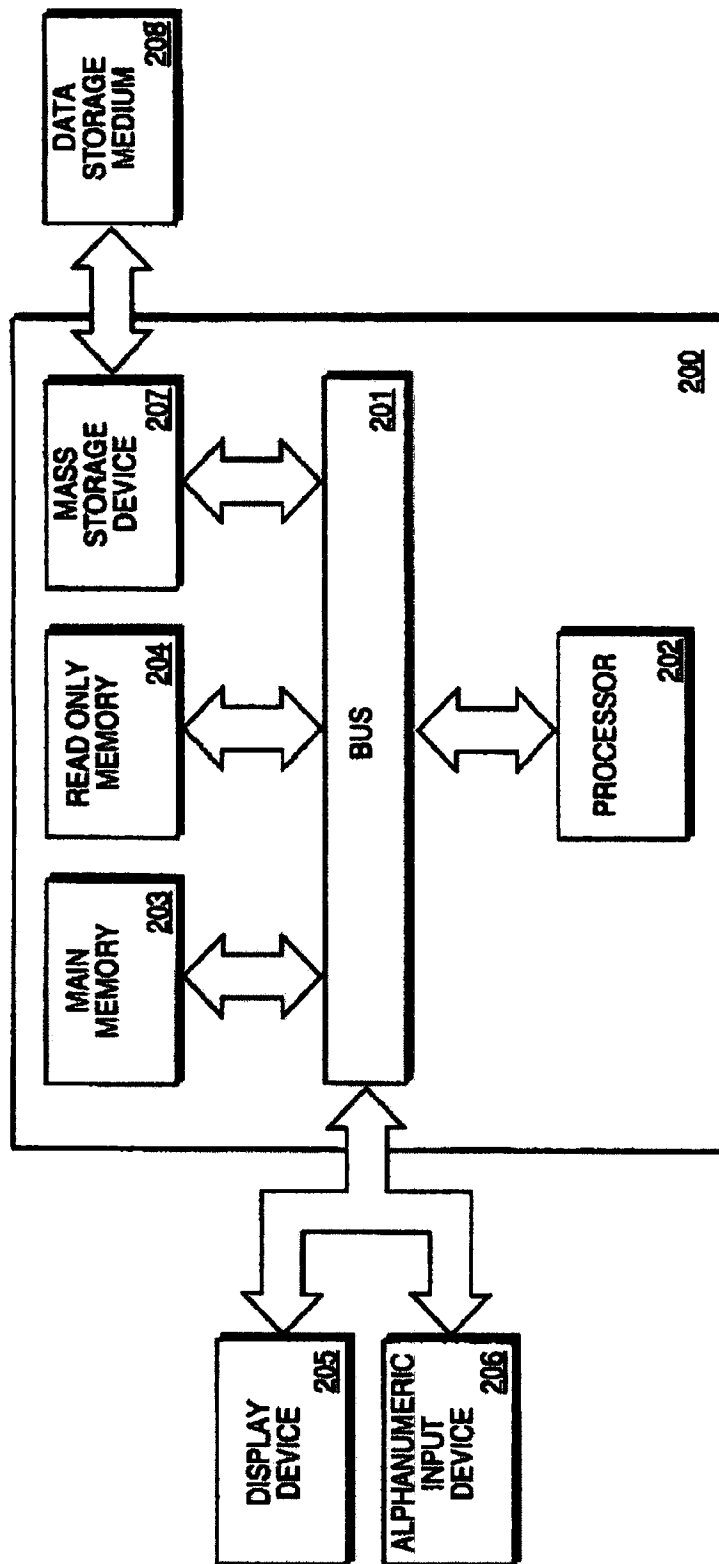
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**FIG. 1A** (PRIOR ART)



**FIG. 1B** (PRIOR ART)



**FIG. 2**

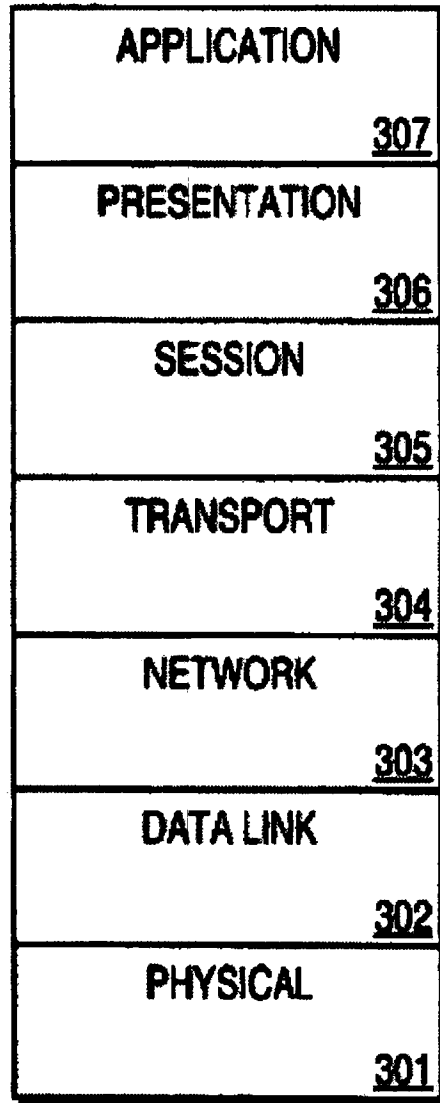
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OSI MODEL  
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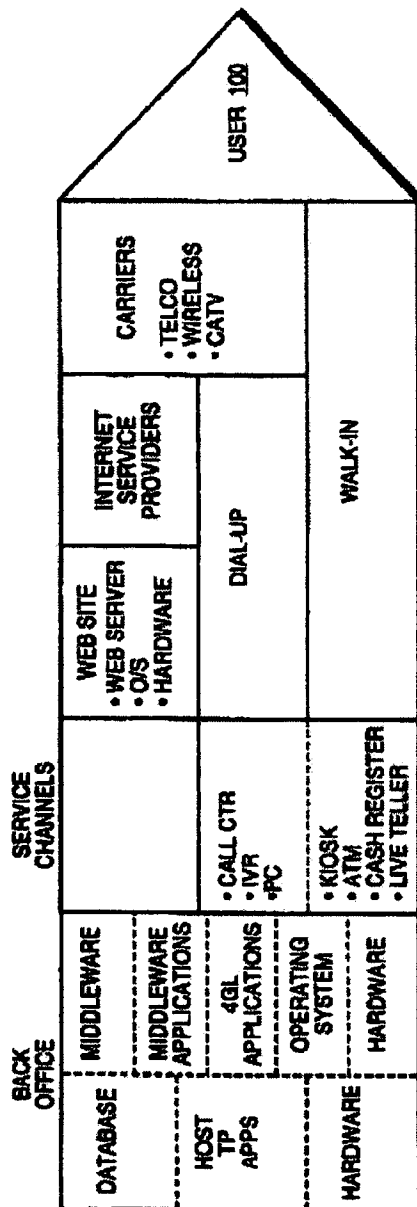
**FIG. 3**

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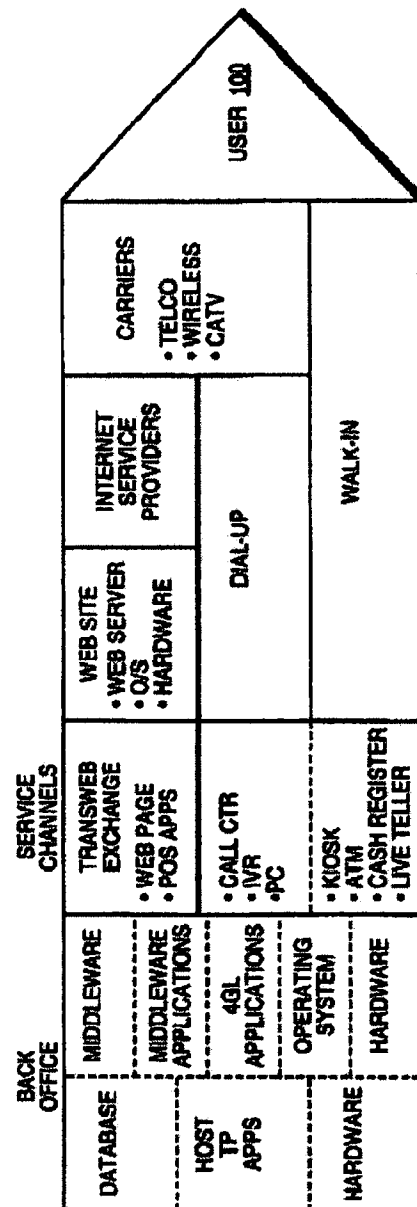
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**FIG. 4A**



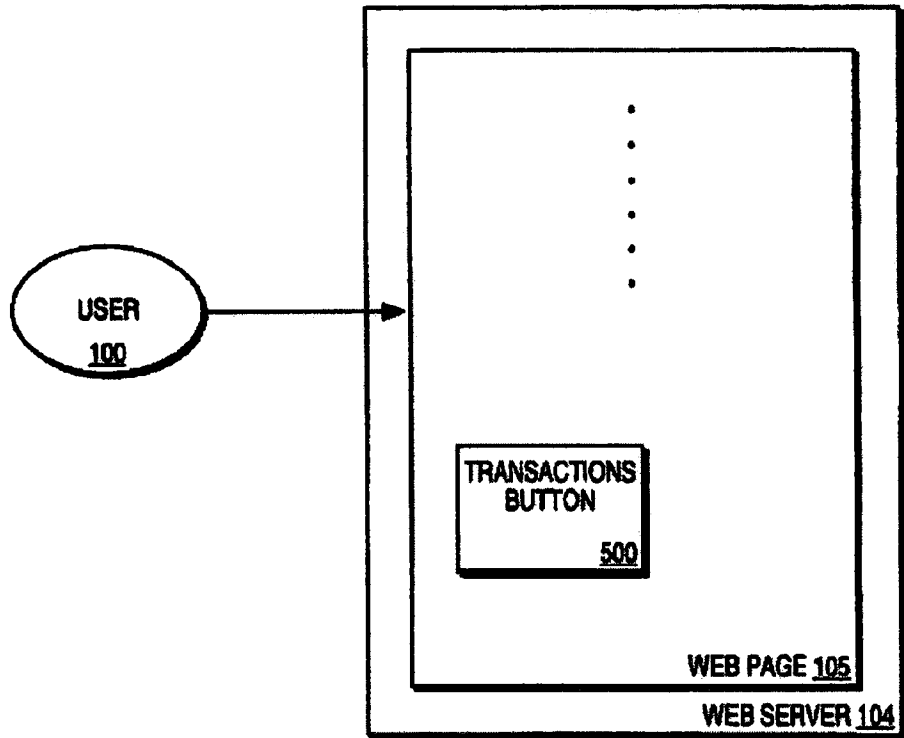
**FIG. 4B**

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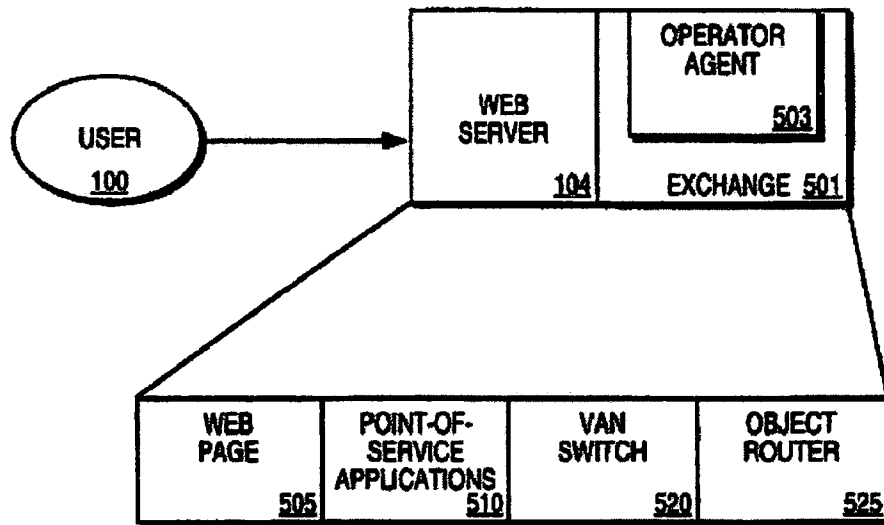
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**FIG. 5A**



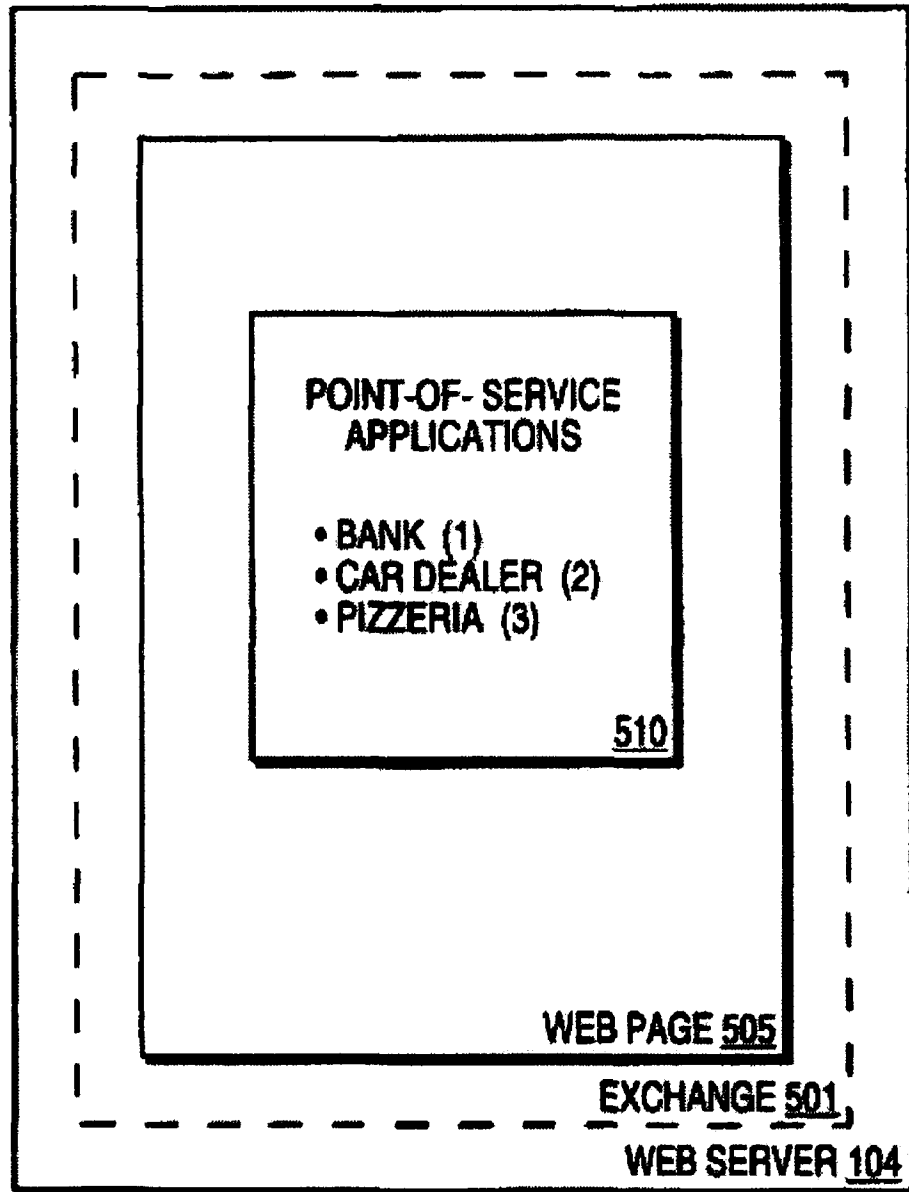
**FIG. 5B**

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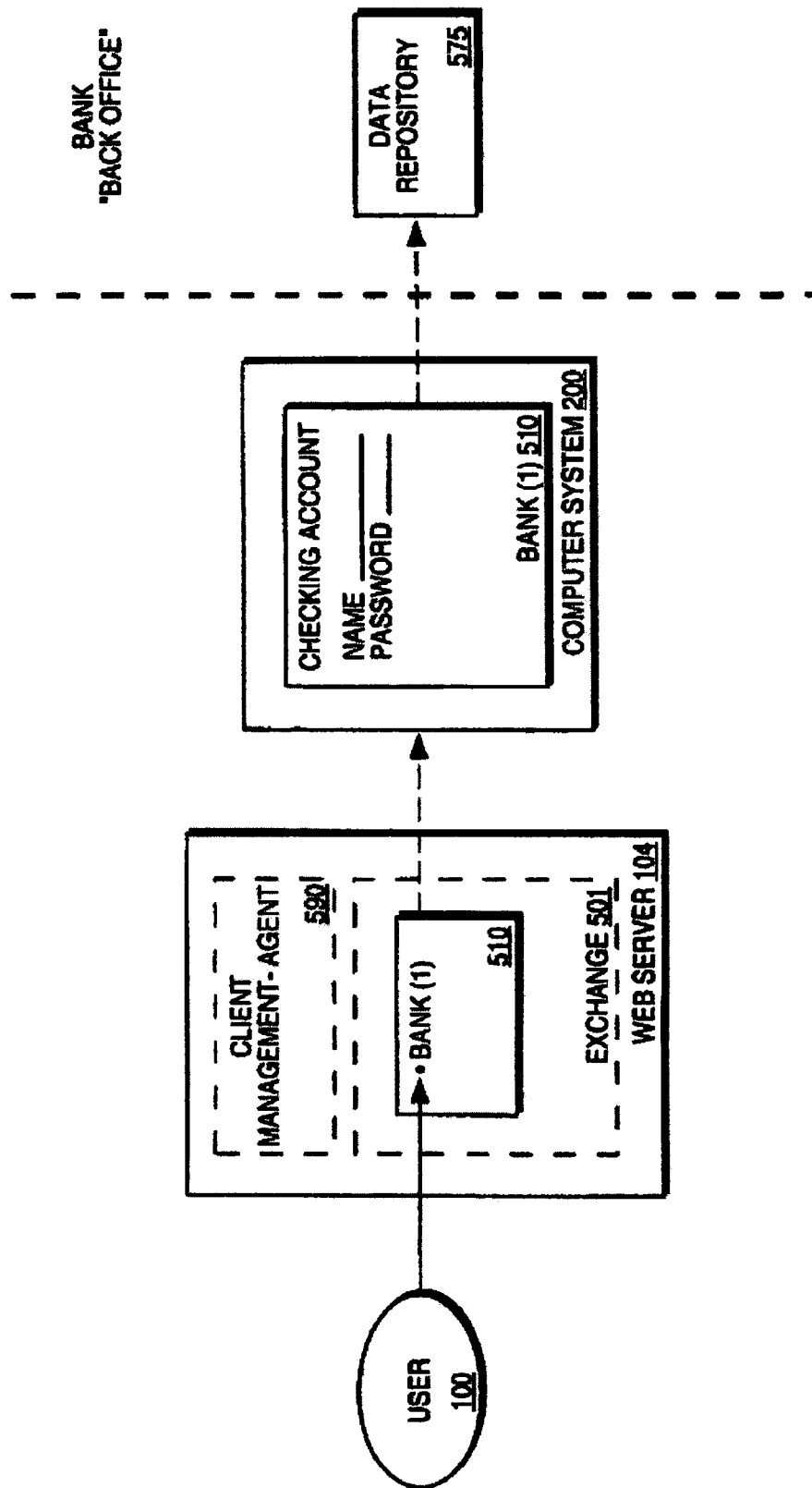
**FIG. 5C**

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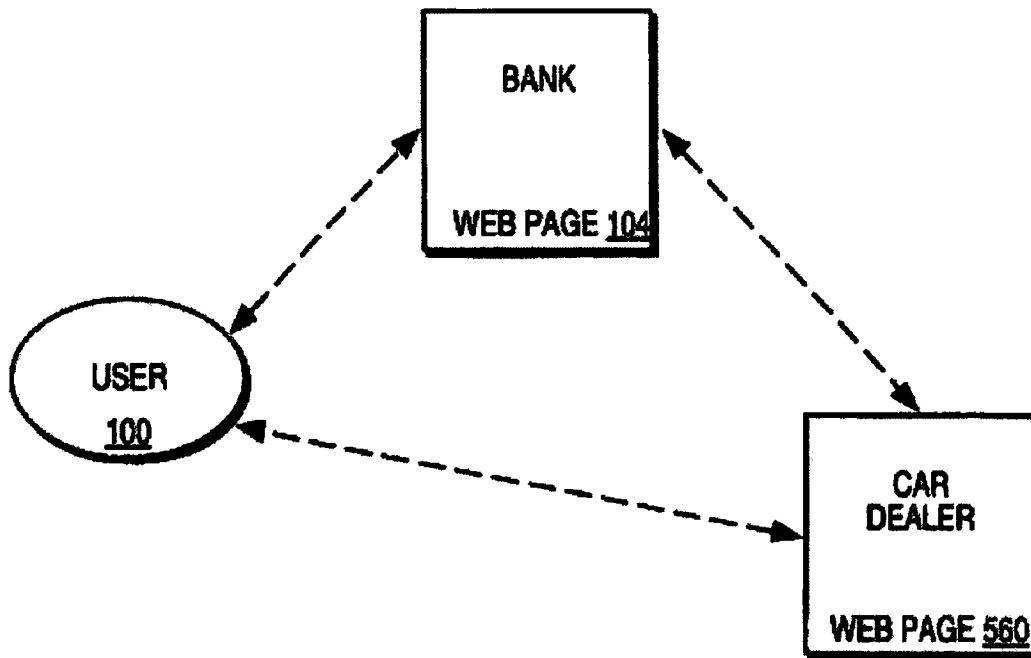
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**FIG. 5D**



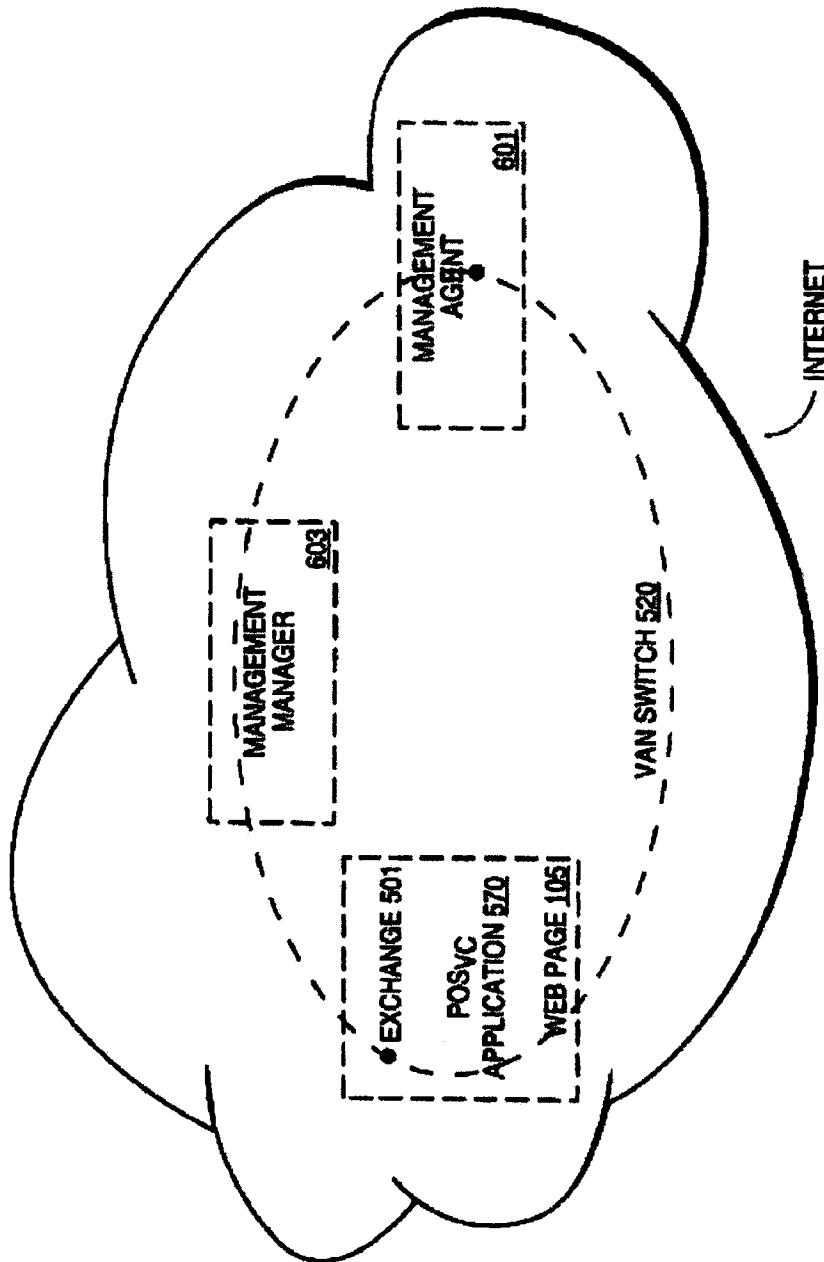
**FIG. 5E**

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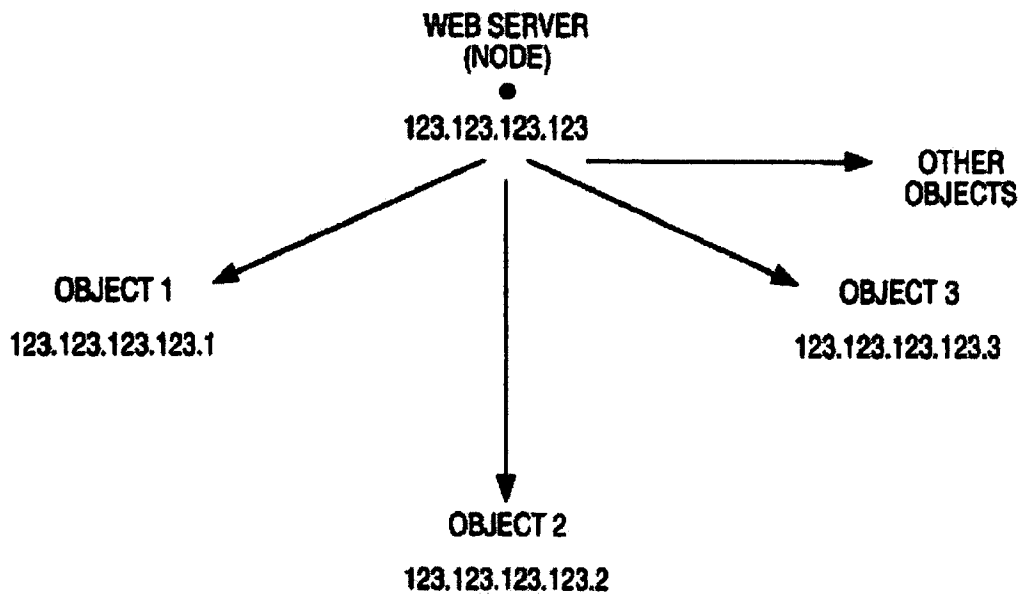
**FIG. 6A**

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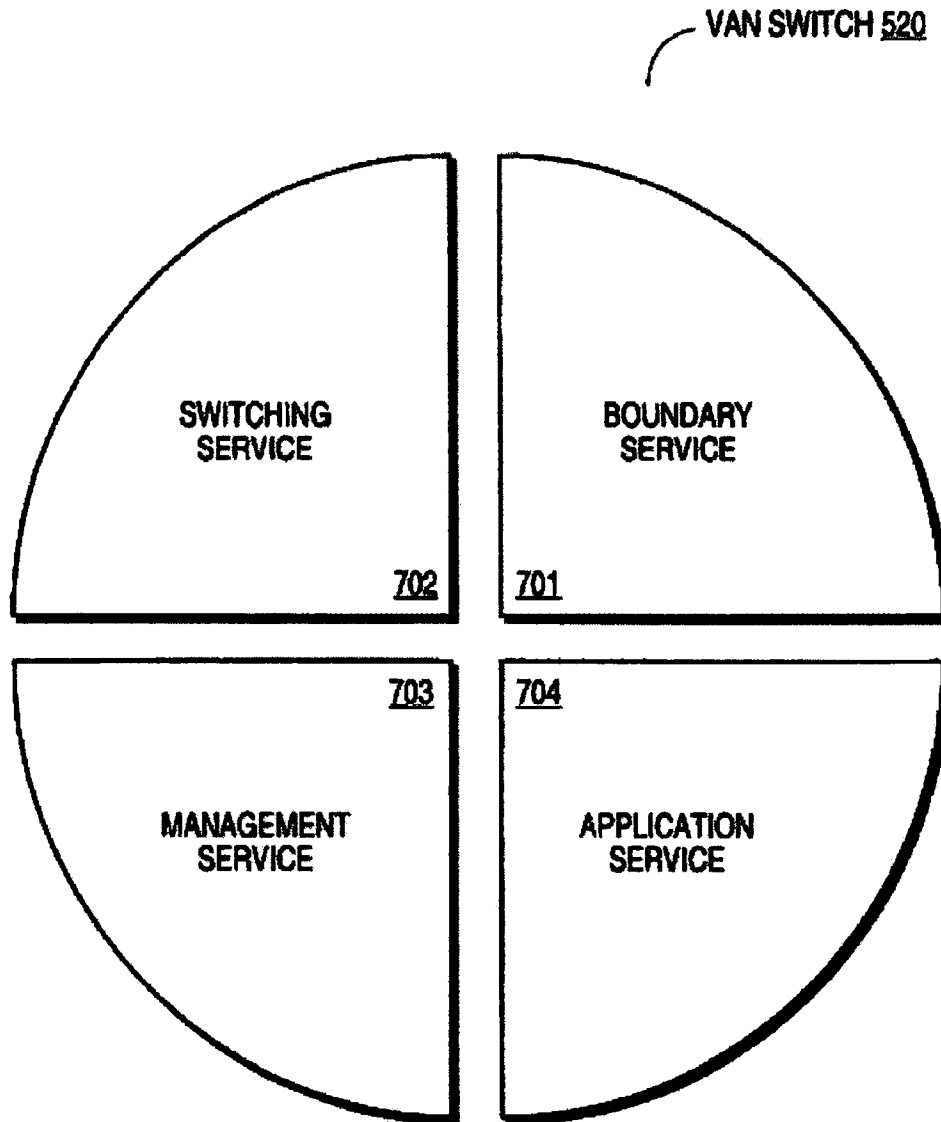
**FIG. 6B**

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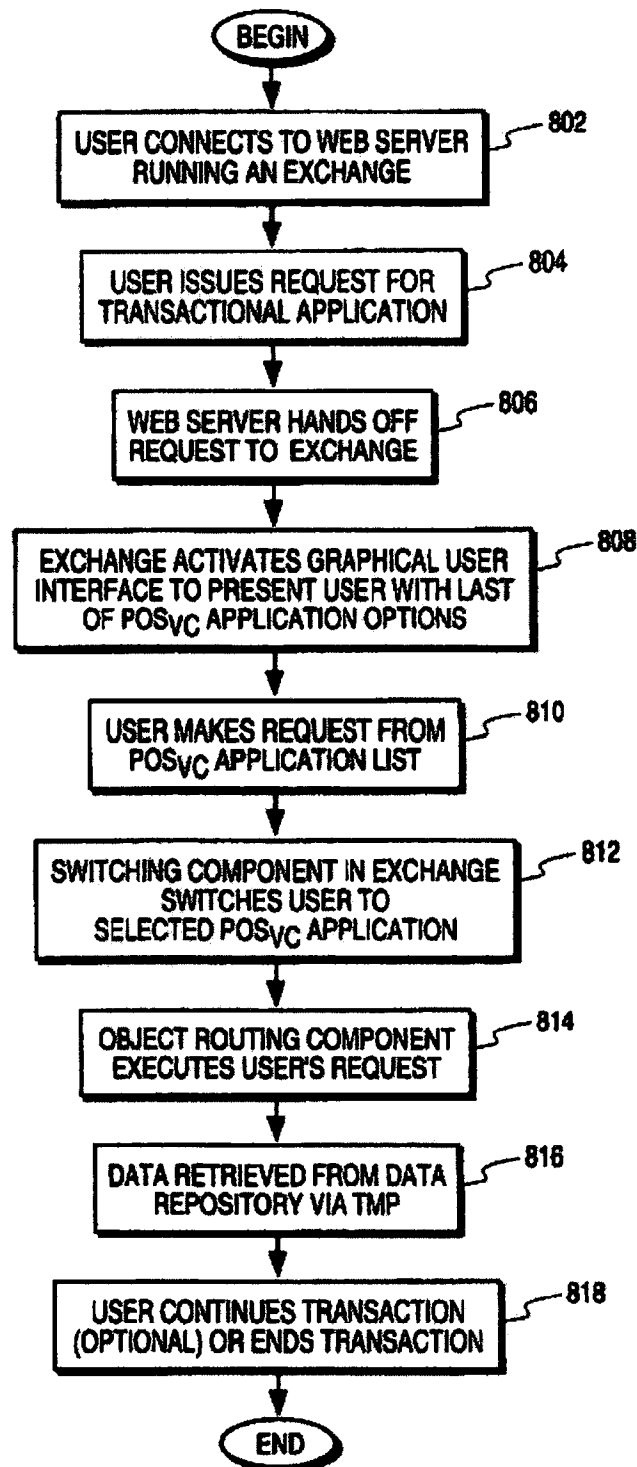
**FIG. 7**

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**FIG. 8**

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**MULTIMEDIA TRANSACTIONAL SERVICES**

This application is a continuation-in-part of application Ser. No. 09/792,323, filed Feb. 23, 2001, now U.S. Pat. No. 7,340,506, which was a divisional of U.S. patent application Ser. No. 09/296,207 filed Apr. 21, 1999, now U.S. Pat. No. 6,212,556, which was a continuation-in-part of application Ser. No. 08/879,958 filed Jun. 20, 1997, now U.S. Pat. No. 5,987,500, which was a divisional of application Ser. No. 08/700,726 filed Aug. 5, 1996, now U.S. Pat. No. 5,778,178, which was related to and claimed priority from provisional application No. 60/006,634 filed Nov. 13, 1995. This application also claims benefit under 35 U.S.C. 119(e) to U.S. Provisional application Ser. No. 60/006,634 filed Nov. 13, 1995.

The following are related applications: application Ser. No. 09/863,704 filed May 23, 2001 and provisional application 60/206,422 filed May 23, 2000.

**BACKGROUND****1. Field of the Invention**

The present invention relates to the area of Internet communications. Specifically, the present invention relates to a method and apparatus for configurable value-added network switching and object routing.

**2. Background of the Invention**

With the Internet and the World Wide Web ("the Web") evolving rapidly as a viable consumer medium for electronic commerce, new on-line services are emerging to fill the needs of on-line users. An Internet user today can browse on the Web via the use of a Web browser. Web browsers are software interfaces that run on Web clients to allow access to Web servers via a simple user interface. A Web user's capabilities today from a Web browser are, however, extremely limited. The user can perform one-way, browse-only interactions. Additionally, the user has limited "deferred" transactional capabilities, namely electronic mail (e-mail) capabilities. E-mail capabilities are referred to as "deferred transactions" because the consumer's request is not processed until the e-mail is received, read, and the person or system reading the e-mail executes the transaction. This transaction is thus not performed in real-time.

FIG. 1A illustrates typical user interactions on the Web today. User 100 sends out a request from Web browser 102 in the form of a universal resource locator (URL) 101 in the following manner: <http://www.car.com>. URL 101 is processed by Web browser 102 that determines the URL corresponds to car dealer Web page 105, on car dealer Web server 104. Web browser 102 then establishes browse link 103 to car dealer Web page 105. User 100 can browse Web page 105 and select "hot links" to jump to other locations in Web page 105, or to move to other Web pages on the Web. This interaction is typically a browse-only interaction. Under limited circumstances, the user may be able to fill out a form on car dealer Web page 105, and e-mail the form to car dealer Web server 104. This interaction is still strictly a one-way browse mode communications link, with the e-mail providing limited, deferred transactional capabilities.

Under limited circumstances, a user may have access to two-way services on the Web via Common Gateway Interface (CGI) applications. CGI is a standard interface for running external programs on a Web server. It allows Web servers to create documents dynamically when the server receives a request from the Web browser. When the Web server receives a request for a document, the Web server dynamically executes the appropriate CGI script and transmits the output

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of the execution back to the requesting Web browser. This interaction can thus be termed a "two-way" transaction. It is a severely limited transaction, however, because each CGI application is customized for a particular type of application or service.

For example, as illustrated in FIG. 1B, user 100 may access bank 150's Web server and attempt to perform transactions on checking account 152 and to make a payment on loan account 154. In order for user 100 to access checking account 152 and loan account 154 on the Web, CGI application scripts must be created for each account, as illustrated in FIG. 1B. The bank thus has to create individual scripts for each of its services to offer users access to these services. User 100 can then interact in a limited fashion with these individual applications. Creating and managing individual CGI scripts for each service is not a viable solution for merchants with a large number of services.

As the Web expands and electronic commerce becomes more desirable, the need increases for robust, real-time, bi-directional transactional capabilities on the Web. A true real-time, bi-directional transaction would allow a user to connect to a variety of services on the Web, and perform real-time transactions on those services. For example, although user 100 can browse car dealer Web page 105 today, the user cannot purchase the car, negotiate a car loan or perform other types of real-time, two-way transactions that he can perform with a live salesperson at the car dealership. Ideally, user 100 in FIG. 1A would be able to access car dealer Web page 105, select specific transactions that he desires to perform, such as purchase a car, and perform the purchase in real-time, with two-way interaction capabilities. CGI applications provide user 100 with a limited ability for two-way interaction with car dealer Web page 105, but due to the lack of interaction and management between the car dealer and the bank, he will not be able to obtain a loan and complete the purchase of the car via a CGI application. The ability to complete robust real-time, two-way transactions is thus not truly available on the Web today.

**SUMMARY OF THE INVENTION**

It is therefore an object of the present invention to provide a method and apparatus for providing real-time, two-way transactional capabilities on the Web. Specifically, one embodiment of the present invention discloses a configurable value-added network switch for enabling real-time transactions on the World Wide Web. The configurable value added network switch comprises means for switching to a transactional application in response to a user specification from a World Wide Web application, means for transmitting a transaction request from the transactional application, and means for processing the transaction request.

According to another aspect of the present invention, a method and apparatus for enabling object routing on the World Wide Web is disclosed. The method for enabling object routing comprises the steps of creating a virtual information store containing information entries and attributes, associating each of the information entries and the attributes with an object identity, and assigning a unique network address to each of the object identities.

Other objects, features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description of the present invention as set forth below.

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FIG. 1A is an illustration of a current user's browse capabilities on the Web via a Web browser.

FIG. 1B is an illustration of a current user's capabilities to perform limited transactions on the Web via CGI applications.

FIG. 2 illustrates a typical computer system on which the present invention may be utilized.

FIG. 3 illustrates the Open Systems Interconnection (OSI) Model.

FIG. 4A illustrates conceptually the user value chain as it exists today.

FIG. 4B illustrates one embodiment of the present invention.

FIG. 5A illustrates a user accessing a Web server including one embodiment of the present invention.

FIG. 5B illustrates the exchange component according to one embodiment of the present invention.

FIG. 5C illustrates an example of a point-of-service (POSvc) application list.

FIG. 5D illustrates a user selecting a bank POSvc application from the POSvc application list.

FIG. 5E illustrates a three-way transaction according to one embodiment of the present invention.

FIG. 6A illustrates a value-added network (VAN) switch.

FIG. 6B illustrates the hierarchical addressing tree structure of the networked objects in DOLSIBs.

FIG. 7 illustrates conceptually the layered architecture of a VAN switch.

FIG. 8 is a flow diagram illustrating one embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention relates to a method and apparatus for configurable value-added network switching and object routing and management. "Web browser" as used in the context of the present specification includes conventional Web browsers such as NCSA Mosaic™ from NCSA and Netscape Mosaic™ from Netscape™. The present invention is independent of the Web browser being utilized and the user can use any Web browser, without modifications to the Web browser. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent to one of ordinary skill in the art, however, that these specific details need not be used to practice the present invention. In other instances, well-known structures, interfaces and processes have not been shown in detail in order not to unnecessarily obscure the present invention.

FIG. 2 illustrates a typical computer system 200 in which the present invention operates. The preferred embodiment of the present invention is implemented on an IBM™ Personal Computer manufactured by IBM Corporation of Armonk, N.Y. Alternate embodiments may be implemented on a Macintosh™ computer manufactured by Apple™ Computer, Incorporated of Cupertino, Calif. It will be apparent to those of ordinary skill in the art that other alternative computer system architectures may also be employed.

In general, such computer systems as illustrated by FIG. 2 comprise a bus 201 for communicating information, a processor 202 coupled with the bus 201 for processing information, main memory 203 coupled with the bus 201 for storing information and instructions for the processor 202, a read-only memory 204 coupled with the bus 201 for storing static information and instructions for the processor 202, a display device 205 coupled with the bus 201 for displaying informa-

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tion for a computer user, an input device 206 coupled with the bus 201 for communicating information and command selections to the processor 202, and a mass storage device 207, such as a magnetic disk and associated disk drive, coupled with the bus 201 for storing information and instructions. A data storage medium 208 containing digital information is configured to operate with mass storage device 207 to allow processor 202 access to the digital information on data storage medium 208 via bus 201.

Processor 202 may be any of a wide variety of general purpose processors or microprocessors such as the Pentium™ microprocessor manufactured by Intel™ Corporation or the Motorola™ 68040 or Power PC™ brand microprocessor manufactured by Motorola™ Corporation. It will be apparent to those of ordinary skill in the art, however, that other varieties of processors may also be used in a particular computer system. Display device 205 may be a liquid crystal device, cathode ray tube (CRT), or other suitable display device. Mass storage device 207 may be a conventional hard disk drive, floppy disk drive, CD-ROM drive, or other magnetic or optical data storage device for reading and writing information stored on a hard disk, a floppy disk, a CD-ROM, a magnetic tape, or other magnetic or optical data storage medium. Data storage medium 208 may be a hard disk, a floppy disk, a CD-ROM, a magnetic tape, or other magnetic or optical data storage medium.

In general, processor 202 retrieves processing instructions and data from a data storage medium 208 using mass storage device 207 and downloads this information into random access memory 203 for execution. Processor 202, then executes an instruction stream from random access memory 203 or read-only memory 204. Command selections and information input at input device 206 are used to direct the flow of instructions executed by processor 202. Equivalent input device 206 may also be a pointing device such as a conventional mouse or trackball device. The results of this processing execution are then displayed on display device 205.

The preferred embodiment of the present invention is implemented as a software module, which may be executed on a computer system such as computer system 200 in a conventional manner. Using well known techniques, the application software of the preferred embodiment is stored on data storage medium 208 and subsequently loaded into and executed within computer system 200. Once initiated, the software of the preferred embodiment operates in the manner described below.

FIG. 3 illustrates the Open Systems Interconnection (OSI) reference model. OSI Model 300 is an international standard that provides a common basis for the coordination of standards development, for the purpose of systems interconnection. The present invention is implemented to function as a routing switch within the "application layer" of the OSI model. The model defines seven layers, with each layer communicating with its peer layer in another node through the use of a protocol. Physical layer 301 is the lowest layer, with responsibility to transmit unstructured bits across a link. Data link layer 302 is the next layer above physical layer 301. Data link layer 302 transmits chunks across the link and deals with problems like checksumming to detect data corruption, orderly coordination of the use of shared media and addressing when multiple systems are reachable. Network bridges operate within data link layer 302.

Network layer 303 enables any pair of systems in the network to communicate with each other. Network layer 303 contains hardware units such as routers, that handle routing, packet fragmentation and reassembly of packets. Transport

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layer 304 establishes a reliable communication stream between a pair of systems, dealing with errors such as lost packets, duplicate packets, packet reordering and fragmentation. Session layer 305 offers services above the simple communication stream provided by transport layer 304. These services include dialog control and chaining. Presentation layer 306 provides a means by which OSI compliant applications can agree on representations for data. Finally, application layer 307 includes services such as file transfer, access and management services (FTAM), electronic mail and virtual terminal (VT) services. Application layer 307 provides a means for application programs to access the OSI environment. As described above, the present invention is implemented to function as a routing switch in application layer 307. Application layer routing creates an open channel for the management, and the selective flow of data from remote databases on a network.

#### A. Overview

FIG. 4A illustrates conceptually the user value chain as it exists today. The user value chain in FIG. 4A depicts the types of transactions that are performed today, and the channels through which the transactions are performed. A "transaction" for the purposes of the present invention includes any type of commercial or other type of interaction that a user may want to perform. Examples of transactions include a deposit into a bank account, a request for a loan from a bank, a purchase of a car from a car dealership or a purchase of a car with financing from a bank. A large variety of other transactions are also possible.

A typical user transaction today may involve user 100 walking into a bank or driving up to a teller machine, and interacting with a live bank teller, or automated teller machine (ATM) software applications. Alternatively, user 100 can perform the same transaction by using a personal computer (PC), activating application software on his PC to access his bank account, and dialing into the bank via a modem line. If user 100 is a Web user, however, there is no current mechanism for performing a robust, real-time transaction with the bank, as illustrated in FIG. 4A. CGI scripts provide only limited two-way capabilities, as described above. Thus, due to this lack of a robust mechanism by which real-time Web transactions can be performed, the bank is unable to be a true "Web merchant," namely a merchant capable of providing complete transactional services on the Web.

According to one embodiment of the present invention, as illustrated in FIG. 4B, each merchant that desires to be a Web merchant can provide real-time transactional capabilities to users who desire to access the merchants' services via the Web. This embodiment includes a service network running on top of a facilities network, namely the Internet, the Web or e-mail networks. For the purposes of this application, users are described as utilizing PC's to access the Web via Web server "switching" sites. (Switching is described in more detail below). Users may also utilize other personal devices such as network computers or cellular devices to access the merchants' services via appropriate switching sites. These switching sites include non-Web network computer sites and cellular provider sites. Five components interact to provide this service network functionality, namely an exchange, an operator agent, a management agent, a management manager and a graphical user interface. All five components are described in more detail below.

As illustrated in FIG. 5A, user 100 accesses Web server 104. Having accessed Web server 104, user 100 can decide that he desires to perform real-time transactions. When Web server 104 receives user 100's indication that he desires to perform real-time transactions, the request is handed over to

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an exchange component. Thus, from Web page 105, for example, user 100 can select button 500, entitled "Transactions" and Web server 104 hands user 100's request over to the exchange component. The button and the title can be replaced by any mechanism that can instruct a Web server to hand over the consumer's request to the exchange component.

FIG. 5B illustrates exchange 501. Exchange 501 comprises Web page 505 and point-of-service (POSvc) applications 510. Exchange 501 also conceptually includes a switching component and an object routing component (described in more detail below). POSvc applications 510 are transactional applications, namely applications that are designed to incorporate and take advantage of the capabilities provided by the present invention. Although exchange 501 is depicted as residing on Web server 104, the exchange can also reside on a separate computer system that resides on the Internet and has an Internet address. Exchange 501 may also include operator agent 503 that interacts with a management manager (described in more detail below). Exchange 501 creates and allows for the management (or distributed control) of a service network, operating within the boundaries of an IP-based facilities network. Thus, exchange 501 and a management agent component, described in more detail below, under the headings "VAN Switch and Object Routing," together perform the switching, object routing, application and service management functions according to one embodiment of the present invention.

Exchange 501 processes the consumer's request and displays an exchange Web page 505 that includes a list of POSvc applications 510 accessible by exchange 501. A POSvc application is an application that can execute the type of transaction that the user may be interested in performing. The POSvc list is displayed via the graphical user interface component. One embodiment of the present invention supports Hyper-Text Markup Language as the graphical user interface component. Virtual Reality Markup Language and Java™ are also supported by this embodiment. A variety of other graphical user interface standards can also be utilized to implement the graphical user interface.

An example of a POSvc application list is illustrated in FIG. 5C. User 100 can thus select from POSvc applications Bank 510(1), Car Dealer 510(2) or Pizzeria 510(3). Numerous other POSvc applications can also be included in this selection. If user 100 desires to perform a number of banking transactions, and selects the Bank application, a Bank POSvc application will be activated and presented to user 100, as illustrated in FIG. 5D. For the purposes of illustration, exchange 501 in FIG. 5D is shown as running on a different computer system (Web server 104) from the computer systems of the Web merchants running POSvc applications (computer system 200). Exchange 501 may, however, also be on the same computer system as one or more of the computer systems of the Web merchants.

Once Bank POSvc application 510 has been activated, user 100 will be able to connect to Bank services and utilize the application to perform banking transactions, thus accessing data from a host or data repository 575 in the Bank "Back Office." The Bank Back Office comprises legacy databases and other data repositories that are utilized by the Bank to store its data. This connection between user 100 and Bank services is managed by exchange 501. As illustrated in FIG. 5D, once the connection is made between Bank POSvc application 510(1), for example, and Bank services, an operator agent on Web server 104 may be activated to ensure the availability of distributed functions and capabilities.

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Each Web merchant may choose the types of services that it would like to offer its clients. In this example, if Bank decided to include in their POSvc application access to checking and savings accounts, user 100 will be able to perform real-time transactions against his checking and savings accounts. Thus, if user 100 moves \$500 from his checking account into his savings account, the transaction will be performed in real-time, in the same manner the transaction would have been performed by a live teller at the bank or an ATM machine. Therefore, unlike his prior access to his account, user 100 now has the capability to do more than browse his bank account. The ability to perform these types of robust, real-time transactions from a Web client is a significant aspect of the present invention.

Bank can also decide to provide other types of services in POSvc application 510(1). For example, Bank may agree with Car dealership to allow Bank customers to purchase a car from that dealer, request a car loan from Bank, and have the entire transaction performed on the Web, as illustrated in FIG. 5E. In this instance, the transactions are not merely two-way, between the user and Bank, but three-way, amongst the consumer, Bank and Car dealership. According to one aspect of the present invention, this three-way transaction can be expanded to n-way transactions, where n represents a predetermined number of merchants or other service providers who have agreed to cooperate to provide services to users. The present invention therefore allows for "any-to-any" communication and transactions on the Web, thus facilitating a large, flexible variety of robust, real-time transactions on the Web.

Finally, Bank may also decide to provide intra-merchant or intra-bank services, together with the inter-merchant services described above. For example, if Bank creates a POSvc application for use by the Bank Payroll department, Bank may provide its own employees with a means for submitting timecards for payroll processing by the Bank's Human Resources (HR) Department. An employee selects the Bank HR POSvc application, and submits his timecard. The employee's timecard is processed by accessing the employee's payroll information, stored in the Bank's Back Office. The transaction is thus processed in real-time, and the employee receives his paycheck immediately.

#### B. Van Switching and Object Routing

As described above, exchange 501 and management agent 601, illustrated in FIG. 6A, together constitute a value-added network (VAN) switch. These two elements may take on different roles as necessary, including peer-to-peer, client-server or master-slave roles. Management manager 603 is illustrated as residing on a separate computer system on the Internet. Management manager 603 can, however, also reside on the same machine as exchange 501. Management manager 603 interacts with the operator agent 503 residing on exchange 501.

VAN switch 520 provides multi-protocol object routing, depending upon the specific VAN services chosen. This multi-protocol object routing is provided via a proprietary protocol, TransWeb™ Management Protocol (TMP). TMP incorporates the same security features as the traditional Simple Network Management Protocol, SNMP. It also allows for the integration of other traditional security mechanisms, including RSA security mechanisms.

One embodiment of the present invention utilizes TMP and distributed on-line service information bases (DOLSIBs) to perform object routing. Alternatively, TMP can incorporate s-HTTP, Java™, the WinSock API or ORB with DOLSIBs to perform object routing. DOLSIBs are virtual information stores optimized for networking. All information entries and attributes in a DOLSIB virtual information store are associ-

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ated with a networked object identity. The networked object identity identifies the information entries and attributes in the DOLSIB as individual networked objects, and each networked object is assigned an Internet address. The Internet address is assigned based on the IP address of the node at which the networked object resides.

For example, in FIG. 5A, Web server 104 is a node on the Internet, with an IP address. All networked object associated with Web server 104 will therefore be assigned an Internet address based on the Web server 104's IP address. These networked objects thus "branch" from the node, creating a hierarchical tree structure. The Internet address for each networked object in the tree essentially establishes the individual object as an "IP-reachable" or accessible node on the Internet. TMP utilizes this Internet address to uniquely identify and access the object from the DOLSIB. FIG. 6B illustrates an example of this hierarchical addressing tree structure.

Each object in the DOLSIB has a name, a syntax and an encoding. The name is an administratively assigned object ID specifying an object type. The object type together with the object instance serves to uniquely identify a specific instantiation of the object. For example, if object 610 is information about models of cars, then one instance of that object would provide user 100 with information about a specific model of the car while another instance would provide information about a different model of the car. The syntax of an object type defines the abstract data structure corresponding to that object type. Encoding of objects defines how the object is represented by the object type syntax while being transmitted over the network.

#### C. Management and Administration

As described above, exchange 501 and management agent 601 together constitute a VAN switch. FIG. 7 illustrates conceptually the layered architecture of VAN switch 520. Specifically, boundary service 701 provides the interfaces between VAN switch 520, the Internet and the Web, and multi-media end user devices such as PCs, televisions or telephones. Boundary service 701 also provides the interface to the on-line service provider. A user can connect to a local application, namely one accessible via a local VAN switch, or be routed or "switched" to an application accessible via a remote VAN switch.

Switching service 702 is an OSI application layer switch. Switching service 702 thus represents the core of the VAN switch. It performs a number of tasks including the routing of user connections to remote VAN switches, described in the paragraph above, multiplexing and prioritization of requests, and flow control. Switching service 702 also facilitates open systems' connectivity with both the Internet (a public switched network) and private networks including back office networks, such as banking networks. Interconnected application layer switches form the application network backbone. These switches are one significant aspect of the present invention.

Management service 703 contains tools such as Information Management Services (IMS) and application Network Management Services (NMS). These tools are used by the end users to manage network resources, including VAN switches. Management service 703 also provides applications that perform Operations, Administration, Maintenance & Provisioning (OAM&P) functions. These OAM&P functions include security management, fault management, configuration management, performance management and billing management. Providing OAM&P functions for applications in this manner is another significant aspect of the present invention.

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Finally, application service 704 contains application programs that deliver customer services. Application service 704 includes POSvc applications such as Bank POSvc described above, and illustrated in FIG. 6A. Other examples of VAN services include multi-media messaging, archival/retrieval management, directory services, data staging, conferencing, financial services, home banking, risk management and a variety of other vertical services. Each VAN service is designed to meet a particular set of requirements related to performance, reliability, maintenance and ability to handle expected traffic volume. Depending on the type of service, the characteristics of the network elements will differ. VAN service 704 provides a number of functions including communications services for both management and end users of the network and control for the user over the user's environment.

FIG. 8 is a flow diagram illustrating one embodiment of the present invention. A user connects to a Web server running an exchange component in step 802. In step 804, the user issues a request for a transactional application, and the web server hands off the request to an exchange in step 806. The exchange activates a graphical user interface to present user with a list of POSvc application options in step 808. In step 810, the user makes a selection from the POSvc application list. In step 812, the switching component in the exchange switches the user to the selected POSvc application, and in step 814, the object routing component executes the user's request. Data is retrieved from the appropriate data repository via TMP in step 816, and finally, the user may optionally continue the transaction in step 818 or end the transaction.

Thus, a configurable value-added network switching and object routing method and apparatus is disclosed. These specific arrangements and methods described herein are merely illustrative of the principles of the present invention. Numerous modifications in form and detail may be made by those of ordinary skill in the art without departing from the scope of the present invention. Although this invention has been shown in relation to a particular preferred embodiment, it should not be considered so limited. Rather, the present invention is limited only by the scope of the appended claims.

The invention claimed is:

1. A method for performing a real time Web transaction from a Web application over a digital network atop the Web, the method comprising:

providing a Web page for display on a computer system coupled to an input device;

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providing a point-of-service application as a selection within the Web page, wherein the point-of-service application provides access to both a checking and savings account, the point-of-service application operating in a service network atop the World Wide Web;

accepting a first signal from the Web user input device to select the point-of-service application;

accepting subsequent signals from the Web user input device; and

transferring funds from the checking account to the savings account in real-time utilizing a routed transactional data structure that is both complete and non-deferred, in addition to being specific to the point-of-service application, the routing occurring in response to the subsequent signals.

2. The method of claim 1, wherein an exchange over the Web is used to complete the transfer of funds in a Web application.

3. The method of claim 1, wherein a management agent is used to complete the transfer of funds in a Web application.

4. The method of claim 1, wherein object routing is used to complete the transfer of funds in a Web application.

5. The method of claim 4, wherein the object routing includes the use of a distributed on-line service information bases.

6. The method of claim 1, wherein a virtual information store is used to complete the transfer of funds.

7. The method of claim 6, wherein the virtual information store includes a networked object specific to a Web application in a Web transaction.

8. The method of claim 7, wherein the networked object is the object identity in a Web transaction connecting from a Web application on a Web page to a transactional application executing anywhere across the Web.

9. The method of claim 1, wherein the Web transaction is a loan requested from a lender across the Web from a Web application.

10. The method of claim 1, wherein the Web transaction is a vehicle purchased with bank financing across the Web from a Web application.

11. The method of claim 1, wherein the Web transaction is accessing an account across the Web from a Web application.

\* \* \* \* \*

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